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### PROTECTED CRUISER ST. LOUIS

The protected cruiser St. Louis was successfully launched late on Saturday last at the Neafe & Levy shipyard, Philadelphia. Miss Gladys Bryan Smith, of St. Louis, acted as sponsor, assisted by Miss Mary S. Wright and Miss Rebecca Reeves Van Lennep, maids of honor. Miss Smith is a member of the class of '06 of Mary Institute, St. Louis, and was selected by Mayor Rolla Wells of St. Louis to name the vessel. James E. Smith, her father, was special commissioner of the Louisiana purchase exposition to Japan. Following the launching the specially invited guests were entertained at a dinner at which Mayor Wells briefly responded to "The Sentiment in the City of St. Louis."

The St. Louis is a sister ship of the Milwaukee, now building at San Francisco, and the Charleston, in course of construction at Newport News. Both of these cruisers have been launched. The vessels are virtually armored cruisers. With the launching of the St. Louis a new record will be established in naval construction here, as the warship has attained a higher state of completion previous to launching, than any similar vessel built in an eastern shipyard. The St. Louis is 77 per cent. completed. Her contract requires her to be able to make 22 knots an hour for six consecutive hours. Her keel plates were laid on May 6, 1900. The dimensions of the St. Louis are 424 ft. in length, 22 ft. 6 inches draught, extreme beam 66 ft., displacement 9,700 tons, about 4,000 tons lighter than the Pennsylvania and Colorado and nearly 5,000 tons lighter than the Tennessee and Washington. Her main battery will be fourteen 6-in. rapid fire breech loading rifles; secondary battery, eighteen 3-in. rapid fire guns, twelve 3-pounders, four 1-pounder automatics, eight 1-pounder rapid fire guns and ten of smaller calibre. Her main belt armor will be 4-inch Harveyized steel.

### BIDS FOR STEAM SHOVELS OPENED

WASHINGTON, May 10.—The Isthmian Canal Commission this week opened bids for furnishing twelve steam shovels for use on the Panama canal. The Marion Steam Shovel Co. of Marion, Ohio, offers twelve 95-ton steam shovels at \$13,065 each or \$156,780 for the twelve. This quotation is for shovels not "knocked down," for which class of machines the Commission has expressed a preference. For shovels "knocked down" the Marion company has submitted a bid of \$12,715 each or \$152,580 for the lot. In either event delivery will be made on the basis of two shovels in August; two in September; two in October; two in November and two in December. The commission also has the option of ordering

twelve additional shovels at the same price if such supplementary contract is made within six months.

The Bucyrus Co., South Milwaukee, Wis., offer to furnish twelve 90-ton steam shovels knocked down at \$143,800 or twelve shovels of the 95-ton type knocked down at \$151,800. Delivery of two shovels per month is promised.

John Souther & Co. of Boston, through Royce & Ricketts agents, offer shovels f. o. b. Boston as follows; One cubic yard bucket shovel at \$5,000 each or \$60,000 for twelve; two cubic yard bucket machine at \$6,500 each or \$78,000; three cubic yard machine at \$7,500 each or \$90,000; two cubic yard bucket (broad gauge) machine at \$5,800 each or \$69,600 for twelve. Shovels to be furnished knocked down.

### GOVERNMENT TAKES OVER PANAMA RAILROAD

Secretary of War Wm. H. Taft last week took over for the government of the United States the active control of the Panama Railroad Co., including its steamship line from New York to the isthmus. The first action taken was the replacement of the old board of directors by Theodore P. Shonts, John F. Wallace, Chas. E. Magoon, Mordecai T. Endicott, Peter G. Hains, B. M. Harrod, Oswald H. Ernst, William Nelson Cromwell, William Barclay Parsons, Clarence Edwards, J. R. de Obaldia, Roger L. Farnham and Edward A. Drake.

Seven of the above constitute the board of Panama canal commissioners as recently reorganized by President Roosevelt. William Nelson Cromwell is the counsel for the Panama railroad; William Barclay Parsons, expert engineer, retained by the company; Edward A. Drake is the former vice-president and secretary of the company, and D. M. Harrod was a member of the old board of directors of the Panama Railroad Co. Colonel Clarence R. Edwards, U. S. A., is chief of the bureau of insular affairs; R. S. Farnham is connected with the firm of Sullivan & Cromwell, and J. R. de Obaldia is the Panama minister at Washington.

The new board of directors was in session in the offices of the Panama Railroad Co. at No. 21 State street, from noon until four o'clock, when the result of its deliberations was announced. Officers were elected as follows: President, Theodore P. Shonts; vice-president and general manager, John F. Wallace; secretary and treasurer, Edward A. Drake; assistant treasurer, Sylvester Deming; assistant secretary, T. H. Rosbottom; general counsel, Sullivan & Cromwell; traffic manager, R. L. Walker; auditor, John Adams; superintendent on the isthmus, A. G. Prescott. Executive committee, Theodore P. Shonts, Charles E. Magoon, John F. Wallace, William Nelson Cromwell and Clarence R. Edwards.

### THE PARISIAN'S INJURIES

On Saturday, March 25, while the Allan line steamer *Parisian* and the Hamburg-American line steamer *Albano* were entering Halifax, N. S., harbor they collided with great force, the latter boat crashing into the starboard quarter of the former, cutting an immense hole through which the water poured in a flood, necessitating such a run for the pier as has never before been witnessed in Halifax harbor, and seldom, perhaps never, in any other port in the world. Imagine, if you can, a 6,000-ton steamer, loaded with frantic passengers, settling by the stern and with her bow away out of the water, rushing up a land-locked harbor full of shipping at the rate of 15 or 16 knots per hour. That is what the *Parisian* did and so little time had she to spare that her stern post touched bottom ten minutes after she had tied to the wharf and in a few hours she was resting in the mud. The collision happened after the *Parisian* had stopped to pick up a pilot. The *Albano*, a 3,000-ton steamer, also loaded with passengers, was lumbering along behind at a fair rate of speed. Through some error of judgment she was allowed to approach too near, and when the danger was noticed it was too late to stop. She blew three whistles, which in the language of the road, meant that she was going astern full speed, but her engines had not turned over many times before the crash came, her bow sinking well into the *Parisian*'s side.



THE HOLE IN THE *PARISIAN*'S SIDE AS SEEN WHILE THE STEAMER WAS IN DRY DOCK AT HALIFAX

### GAS PRODUCER AND ENGINE FOR MARINE USE

By George E. Walsh

The development of the gas engine from small horse-power units dependent upon city gas for fuel to the modern producer gas engines ranging from one thousand horse-power upward has steadily widened the field of service for this form of power production. So long as the engine was adapted only to the utilization of rich city gas it could not compete with steam except in a few very limited fields where small horse-power units were needed. The improvement of the gas engine so that it could burn with equal facility the relatively poor blast furnace and producer gases immediately opened a wide future for it.

In the past year or two efforts to combine gas engines with producer plants so that the simple conversion of coal into gas for use in the former could go on continuously and almost automatically have resulted in important revolutionizing changes. The gas engine has become a power producer as portable in nature as steam, and its relatively high efficiency and economy of operation promises much for the future. The most recent adaptation of the gas producer and gas engine as a combined power producing plant has been made in railroad and marine fields. Until very recently it was never supposed that gas engines could compete with steam in any

other than stationary plants. As a prime mover where cheap gas could be supplied, it could make a most important showing; but it was not suggested that the gas engine could cut loose from a stationary gas tank and producer plant.

The only alternative was to construct a portable gas producer, which would supply continuous fuel for the engine, and the accomplishment of this idea has proved one of the most important developments of this type of prime mover. Efforts have been directed toward the development of the idea by the marine experts in the American and German navy, and by the Thornycrofts, of England. The saving of space on ships has been one of the most important factors in the problem, and the economy and efficiency of operation have also proved of vast significance.

The modern marine producer-gas plant consists of a generator of fuel, and the gas engine or motor for driving the machinery. The combination of the two make a complete plant in which many of the equipments of a steam engine are abolished. In the producer-gas plant and engine experimented with by the Thornycrofts, a ten horse-power engine has been run continuously for many days at as low a cost as two cents per hour.

The automatic operation of the plant dispenses with a good deal of high-priced labor, and the low cost of maintenance cuts down the expense of operation to a low figure.

The gas producer of the modern type consists of a large firebrick-lined drum placed above a water reservoir, and the fuel generated is a combination of producer and water gas. The coal is fed from above, and as it falls down into the grate it is automatically distributed so that at no time is there a sudden change in the quantity or temperature of the gases produced. The air-blast from below is accompanied by a jet of steam, which has the double purpose of reducing the temperature inside and of softening and breaking up the clinkers and ashes. A water reservoir is built inside of the drum in a conical shape, and the gases flow through this above. A cooler is supplied to reduce the high temperature of the gas, and no part of the gas can escape without coming in contact with a water jet which cools it and carries off impurities.

The generator is furnished with scrubbing and other mechanical devices for refining the gas, and when the fuel finally emerges from the centrifugal driers and churns it is ready for immediate combustion in the engine. The gas is not high grade, such as used for illuminating purposes, but it is rich enough for burning in the modern gas engine with large cylinder capacity. The average quality of the gas generated in such a producer is 137 British thermal units per cubic foot.

The modern large cylinder gas engines are designed to utilize gas of only 135 British thermal units per cubic foot, and in fact many of them can burn with economy weak blast



furnace gas of only 80 thermal units. The gas engine can be depended upon to deliver a brake horse-power-hour for every 12,500 thermal units. In the producer-gas plants an immense volume of gas is supplied, every pound of coal yielding from 50 to 75 cubic feet of gas, one-half of which, however, has no combustive energy whatever.

The gas from the marine type of plant passes from the generator through a double-seat valve to the combustion chamber of the engine. The valves admit a proper amount of air to mix with the gas. In a thirty-horse power plant of this character, the cylinders of the gas engine are 8.27 inches in diameter and the stroke 11.02 inches. At a normal speed the engine makes 200 revolutions per minute. The gas compression is 175 lbs. per square inch, and the explosion pressure ranges from 400 to 500 lbs. to the square inch. The engine has large cylinders so that very low quality of gas can be burnt, and as a consequence a cheap, inferior grade of coal can be used. Although anthracite coal gives the best results, and from an economical point of view is often the most desirable, the gas producer and engines are designed also for the burning of bituminous coal.

As space and weight of any prime mover for marine purposes are important factors in their usefulness, the combination gas producer and engine have been made as compact and light as circumstances would permit. In the Thornycroft marine gas combination, the total weight of the engine of 30-H. P. capacity and gas producer is 4,150 lbs., and the space occupied  $7\frac{1}{2}$  ft. by  $3\frac{1}{2}$  ft. Such a combination unit is intended for a heavy type of craft such as a ferryboat, barge or tug. The power obtained from such a prime mover, and the low cost of maintenance, make the gas engine of important advantage to certain types of commercial craft, and there are other considerations worthy of notice. Notable among these is the practical elimination of the huge smokestacks which are so conspicuous on modern ocean steamers. The space occupied by the smokestacks has been steadily increased in recent years, and there is a direct ratio existing between their size and the power of the steam engines. Even the adoption of the steam turbine does not lessen the space required for smokestacks, and the gas engine appears to be the only type of prime mover that can be operated without huge smoke outlets.

At present the average gas producer has not been able to use the cheap grades of coal with the same economical results with which they are consumed under the steam boiler of the transatlantic liners. Improvements have been made in this

direction recently, but to make the self-contained producer and engine plant perfect further developments must be made in the way of burning the cheaper grades of fuel. This appears to be a matter of technical engineering skill which has a fair promise of realization. The purification of the gas by mechanical methods has been steadily improved in the past year, and gas producers are designed today which refine the gas so that it can be used in gas engines with comparatively small cylinders.

The poorer the grade of coal burnt, the more difficult and expensive is it to secure

a gas of proper quality for burning. Thus in soft coals an immense volume of hydrocarbons is released, and these must be removed from the gas by mechanical washers. Otherwise they might condense in the form of tar in the engine and quickly reduce its economical operation. The gas producers installed for handling bituminous coals are consequently equipped with more mechanical parts, and the initial expense of building is much greater. Their mechanical efficiency is also lower than the simpler plants built for handling anthracite coals. Anthracite pea coal is considered the ideal fuel for the gas producer, for the gas obtained therefrom contains no by-products that must be removed by special machinery.

The adoption of the gas engine for marine purposes thus possesses certain advantages which appear to promise considerable innovations in the near future. While the problem of using the gas engine and self-con-



THE ALBANO'S BOW AFTER THE COLLISION.

tained gas producer on warships has been theoretically worked out by experts in the German and American navy, it does not appear from present conditions as if this type of prime mover will immediately invade this field; but certainly from experiments made abroad by the Thornycrofts there is a strong probability that the gas engine will be employed profitably on barges, tugs, ferry-boats, and similar craft where space and weight below decks are not so important factors. There are many other types of commercial craft which could apparently profit by such a prime mover.

The gas engine is practically self-contained and operated without much skilled attention. The small horse-power gas engines are even run without licensed engineers, and when not in use there is absolutely no waste or loss of power. Where the combination of producer and engine is employed, the loss is insignificant. When the power is shut off the gas generated is stored, and by reducing the air and steam blast the formation of gas would temporarily cease. The fire could quickly be fanned into existence again, and quick starting

could be depended upon. On steamboats where frequent stopping and starting are necessary the gas engine should prove an economical form of prime mover, and the saving effected should be considerable.

In order to facilitate quick starting, the marine type of gas producer is provided with a small auxiliary air blower driven by a gasoline motor. When the fire is first lighted, a steady and continuous blast of air is required, and the consumption of coal goes on as in an ordinary furnace. The gases are all allowed to escape until the ring of coal and ashes becomes incandescent. After that the process becomes purely automatic, the gas being confined in its chamber and forced through the water and the various washing and refining machines until it is automatically admitted into the combustion chamber of the engine. The governing arrangement is so arranged that the explosions increase or decrease with the speed of the engine. The cylinders are water cooled so that no danger from high temperatures is possible, and the water heated in the jacket is carried back to be used as steam for injection with the air. As a compact marine prime mover of high efficiency and low cost of maintenance, the gas producer and engine thus offers advantages that may cause some radical changes in the designing of certain classes of commercial craft, and it may not be many years before the gas engine will obtain as much popularity as the steam turbine has within the past few years.

#### FERRY BOAT SAN FRANCISCO

The new ferry boat San Francisco which has just been completed for the San Francisco, Oakland & San Jose Railway Co. has had a very successful trial trip, proving herself to be the fastest boat of her class on the bay which highly pleased her owners, designers and builders. When in service she will be used on the Key Route, a distance of  $2\frac{3}{4}$  miles which she can easily make in  $10\frac{1}{2}$  minutes, including landings.

The principal dimensions are as follows: Length over all, 201 ft.; length on waterline, 176 ft.; moulded beam, 35 ft. 3 in.; depth of hold, 17 ft. 9 in., and a total width over the guards of 58 ft. The hull is built of wood with the exception of five steel bulkheads which divide her into six watertight compartments to insure perfect safety in case of collision. The frames, stern posts and keel are of oak while the outside planking is of well seasoned Oregon pine sheathed with copper.

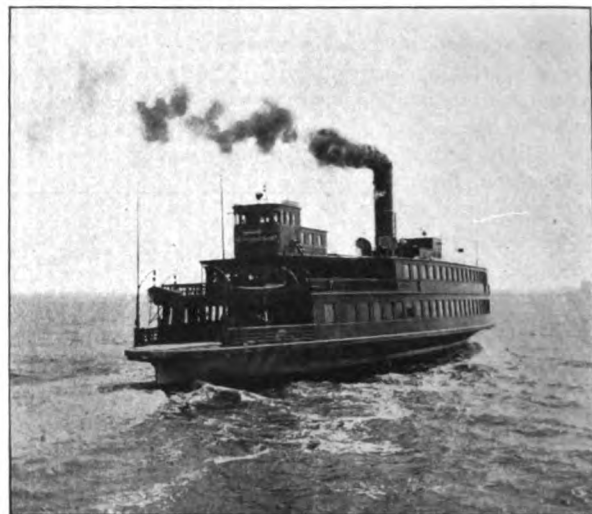
The main deck house is 128 ft. in length, pine framed, with highly polished California redwood finish, and mahogany seats and contains a news stand, restaurant and barber-shop. Above this is located the saloon deckhouse, which is 86 ft. long and finished similar to the main deckhouse and contains a band stand, candy stand and ladies' toilet.

The two pilot houses and officers' quarters are on top of the saloon deckhouse located at either end. Steam is generated by two water-tube boilers of the Babcock & Wilcox type fitted to burn oil. Steam is carried at a pressure of 200 lbs. to the square inch. The main engine is of the open front, double compound type with the high pressure cylinders 20 in. in diameter and low pressures 42 in. with a common stroke of 28 in.

All pistons work on a common crank shaft which connects with the propeller shaft, extending the entire length of the boat, fitted with a four bladed bronze propeller at either end. The propellers have a diameter of 9 ft. 9 in., and pitch of 12 ft. 6 in. The auxiliaries are mostly of the Blake type and consist of a fire, bilge, air, feed, sanitary, circulating and oil pumps. Two Williamson steam steerers are fitted one at either end of the boat. The electric light plant contains two direct connected sets with a combined power of 30 kilowatts.

On the trial the engines developed 2,000 I. H. P. at 150

revolutions, giving the vessel a speed of 15 knots. The vibration is very slight at full speed and is no doubt due to the type of engine adopted which will admit of accurate



FERRYBOAT SAN FRANCISCO.

balancing. The San Francisco was designed by Mr. H. J. Gielow of New York and built by John W. Dickie of Alameda and is the third successful ferry boat built by him for this route.

#### LAUNCH OF THE AMERIKA

On Thursday, April 20, Messrs. Harland & Wolff, Belfast, launched the fine large steel twin screw passenger steamer Amerika for the Hamburg-American Line. The new steamer has a gross tonnage of about 22,800 and when completed will be the largest vessel afloat outside the British mercantile marine. She will be fully fitted up for a very large number of first, second, intermediate, and third class passengers, the accommodation for the higher class passengers being most elaborate and luxurious, and that for the other classes also exceptionally good. Several new features have been introduced into the vessel, the chief of which are the special restaurant—which has already been fully described and will doubtless prove a great attraction—and a fine recreation room containing a gymnasium and other facilities for athletic exercises, which will also be much appreciated by passengers desirous of such recreation. As usual in the large vessels built by this firm, the machinery is of their quadruple expansion "balanced" type, reducing vibration to a minimum, a condition to which so much importance is attached nowadays, when engineers are eagerly discussing the merits of different types of engines. The practical immunity from vibration gained by the introduction of quadruple expansion and the "balanced" principle, as scientifically worked out by Harland & Wolff and practically demonstrated in the vessels already built by them, is a significant fact at the present time as illustrating the perfection to which the reciprocating engine has been brought.

The launch of the Amerika was made unusually interesting by the presence of three members of the government—The Lord President of the Council (Lord Londonderry), The Chief Secretary for Ireland (The Right Hon. W. H. Long, M. P.), and the Solicitor General for England (The Right Hon. Sir Edward H. Carson, M. P.)—whose attendance on the occasion would doubtless be very gratifying to owners and builders alike. The owners were represented by Capt. Sauermann, Mr. C. Van der Smissen and Mr. J. Edelmann.



## TRADE CONDITIONS AT BUFFALO

BUFFALO, May 9.—Nine vessels from the ice fleet at the dry-dock and a mile and a half of ice in front of the harbor yet, was the report for Buffalo at the end of the first week in May. It was not very inspiring, taken as a commentary on the practice of the vessel owners of the lakes, especially as it is merely a little worse than is commonly the case with our spring openings. The man who rushes to the car door before it stops and gets all his wraps and overshoes on at the theater for a plunge outside ahead of everyone else is the same man as the one who tries to force his vessel through the ice before it is safe to do so. We are always bound to conduct our affairs in that fashion, apparently.

The incomprehensible part of the foolishness in the lake opening is that the insurance companies will pay losses year after year without trying to prevent their repetition. They could easily take steps that would prevent these losses, which are practically without hope of gain and therefore quite useless. For the vessel owner cannot be expected to do anything of the sort. If there is a chance of getting out next spring ahead of the disappearance of the ice it will be taken with all the readiness that it was now.

Vessel men say that the lake trade to date has been very badly demoralized by the opening that did not come off as was expected, so that there is as yet no settling down to anything. Nothing reached destination when it was expected. Mills in Buffalo stood still because the wheat they must have was fast in the ice somewhere, coal that was sent out for upper-lake ports with some view to unloading as fast as it arrived, was so hunched by the detention that some ports were crowded full of cargoes. The hard-coal shippers here made haste to cut down their shipments as soon as they saw what was going to happen and have since confined their business to side ports. Only about a third of the average shipment has been made for some weeks and a single jag was all that went out for the head of Lake Superior all last week.

It is quite likely that there was much the same state of things at the big ore and soft-coal ports and this at the outset is anything but inspiring, for the vessel owner has been saying from the time the spring rates were made that the only hope of a fair profit in the trade was good unloading speed.

Still there is prospect of better things before long. The ice is about out of the way and the demand is such for practically everything that it is predicted that after the middle of the month things will settle down to a pace that will give both carriers and handlers the right cue, so that there will be much less falling over each other than there has been so far and it is believed less detention generally, for there is more demand for practically everything than there was a year ago and that alone is enough to make a difference, while there is at least some improvement in the ore-unloading accommodations.

Buffalo will receive considerably more ore than last season. The amount has increased pretty rapidly right along for several years, but furnace capacity has increased very fast lately. The new Buffalo & Susquehanna furnace is to start up its second 300-ton furnace as soon as possible, but is not able to take ore direct as yet. The canal is finished and the apparatus is ready, but there is a bar formed at the mouth of the canal and the ice still drifts about in such liberal fashion that no work can be done by the dredges as yet.

It was a matter of disappointment to find that the smashing of the May wheat corner did not reduce prices to an export basis, either for wheat or flour, the latter being, of course, the product that we care most to sell abroad. It is not expected that any further decline will be made in prices till more is known of the growing crop, so the lake movement of grain is not likely to be very heavy right away, though the condition of the corn has improved so much of late that car shipment through has dropped off and it is coming by lake in

fair quantities. The big 10,000,000 bushel early grain fleet that used to be looked for here is a matter of history, but this port some days ago passed the 5,000,000 mark and is doing fairly well.

There is a little stir in lumber carrying, but the entire amount cannot be great and the midsummer drop-off promises as certainly as it did some time ago to drive the lumber fleet largely after grain or ore. With these conditions it seems to be ore quite as much as ever that must make the season and it is pleasant that there are old heads in the carrying trade who are looking to see it do it.

JOHN CHAMBERLIN.

## WORK ON LAKE NAVIGATION

The International Correspondence Schools, Scranton, Pa., have recently added to their library of technology three volumes relating respectively to marine engineering, ocean and lake navigation. In each volume is crowded an enormous mass of information, but so beautifully systematized and so completely indexed that every part is available for immediate consultation.

The work on lake navigation first explains the principles on which the position of any point on the earth's surface is determined, followed by numerous examples showing the relation between latitude and longitude and time. About fifty printed pages are devoted to the compass, its errors and adjustments, beside describing the methods of determining and tabulating any error the compass may have after being compensated. Special attention is given to the subject of course corrections and the diagrams accompanying each problem on this subject will be found of great value in avoiding errors in applying corrections for leeway variation and deviation. All the methods of practical utility in coast navigation are explained, including the use of vertical and horizontal danger angles. The methods for fixing a ship's position at sea by keeping accounts of courses and distances run are carefully considered.

Determining the errors of the compass by means of observation of the sun is next taken up. Amplitude tables and a variation chart, expressly prepared for the great lakes, accompanies this subject and matters relating to time, declination, azimuths, amplitudes and the use of the pelorus are here fully explained and illustrated by examples worked out in detail. Notes relating to the propulsion of vessels with explanation of the pitch and slip of the propeller, speed problem and notes on coal consumption are included. Then follows a thorough treatment on the causes of storms and the barometric changes attending them with suggestions as to the handling of steamers in heavy weather.

Included in the volume on lake navigation is the treatment of nautical astronomy. While this subject should have naturally followed that of dead reckoning, it was necessary to include it in the volume devoted to lake navigation in order to preserve uniformity of size.

The volumes are excellent specimens of book work and are invaluable to those contemplating a study of marine engineering, ocean or lake navigation.

Wellbanks, Crandall & Co., of Duluth, Minn., have issued a really sumptuous book under the title of Minnesota Iron Mines. The historical data was prepared by Mr. Dwight E. Woodbridge, of Duluth, and the photographs with which it is illustrated were taken by Mr. R. S. Crandall. The Review has not been privileged to see a work that is more pictorially representative of the great iron ore business of the lakes than this book. The illustrations are in every instance superb ones and the brief data concerning them is absolutely correct because no one has made a greater study of it than Mr. Woodbridge. The price of the work is \$1.00.



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The committee on rivers and harbors of the house of representatives is now making a tour of the Ohio river as the guests of the Ohio Valley Improvement Association. In projecting this trip the Ohio Valley Improvement Association is moved by the desire to give the members of this committee the visual evidence of what the added improvement of this stream means to the internal development of commerce. By the tow barge system freight can be moved along this stream at an incredibly low cost. Owing to the shallowness of the water it is not possible, however, to utilize the river except in the spring time when advantage is taken of the annual freshets. During this brief period which lasts only about six weeks an enormous quantity of freight is moved at a ridiculously low cost per ton per mile. Transportation is, of course, an important factor in the cost of any product and if by generous appropriations the ton cost per mile can be lessened it means that the whole country at large must reap the benefit.

Lake interests are being gradually impressed with the opportunity for a great display upon the occasion of the celebration commemorating the completion of the Sault Ste. Marie canal to commerce. So prodigious has the commerce that utilizes this canal grown that it seems incredible that it should have been accomplished within so short

a space of time as fifty years. Through that very slender throat pours a torrent of freight such as can be observed nowhere else in the world. It is a tortuous channel, jagged and rough, which artifice has endeavored to make secure, but so narrow that a single ship may block it for days and yet day and night, week in and week out, ships as large as ocean liners ply up and down this channel, one ship never being out of sight of another. In the brief eight months that nature permits the channel to be open more than three times the commerce that passes through Suez is locked through this canal. And yet Suez connects two great continents. Suez is the highroad to the most populous part of the world; and yet should the commerce of Sault Ste. Marie sink to its level it would bring irretrievable ruin to thousands.

Fifty years is a short time to bring about such a revolution and yet fifty years ago Lake Superior, the father of Lakes, floated nothing bigger than the batteaux of French voyageurs. Today what is there to be seen? The procession of lake vessels leaves Duluth. It is joined at Two Harbors by a fleet equally as great; it meets a third detachment at Ashland and it joins the old guard at Marquette. In a majestic file they pass through Sault Ste. Marie and become a part of the great squadron that enters Lake Huron through the straits of Mackinaw. This great procession, 96 per cent of it flying the American flag at the stern, enters the St. Clair river, forming with the innumerable pleasure craft the the St. Clair and Detroit rivers a gorgeous pageantry and the most commercially impressive upon earth. Fifty million tons are passing by, thirty millions of it being iron ore, which must be worked up by hundreds of thousands of artisans to do service to mankind in innumerable ways. Consider what that means to the material welfare of a people. Therein lies the most potent and powerful reasons why the whole nation should participate in celebrating the construction of the Sault Ste. Marie canal. Without these iron ore deposits the United States could not possibly be the industrial leader that it is. It would still be importing pig iron from Great Britain, whereas by virtue of these deposits one single American company is now making more steel than is made in the whole of Britain.

As long as Great Britain has vessels of 16,000,000 tons, over 14,000,000 of which is steam, she will remain the world's ocean carrier. The United States has vessels of 897,000 tons in the foreign trade, a considerable part of which is sail. We have to multiply the steam vessel by two and a half to determine its potential tonnage when compared with sail. A steamer can make schedule trips. A sail vessel cannot. Britain's potential tonnage is, therefore, nearly 40,000,000 as against a miserable 897,000 for the United States. This condition is not natural in a country whose export trade is the greatest among nations. It



is the direct result of discrimination against the American ship by the national government. Congress should remove the handicap so imposed by legislation favorable to shipping.

#### ORE ON LAKE ERIE DOCKS MAY 1, 1905

The amount of ore on Lake Erie docks on May 1, of the present year is less than it has been any year since 1900. The amount is 2,271,631 tons for May 1, 1905, as against 3,317,627 tons for April, 1905. The amount on docks Dec. 1, last, was 5,763,399 tons so that during the winter season (Dec. 1 to May 1) 3,491,768 tons have gone forward to the furnaces. The total amount of ore moved over Lake Erie docks to furnaces in the full year ending May 1, 1905, was 20,057,070 tons, as against 18,739,995 tons in 1904 and 21,905,251 tons in 1903.

Figures showing the total ore passing to furnaces over Lake Erie docks in the year ended with the first of the present month are found in this way: We know that on Dec. 1, 1904, Lake Erie docks contained 5,763,399 tons; deducting from this 2,271,631 tons, the amount of ore now on dock, we find that shipments to furnaces during the winter period (Dec. 1 to May 1) amounted to 3,491,768 tons, which added to 16,565,302 tons, the amount shipped to furnaces during the navigation season of 1904, gives 20,057,070 tons as the entire consumption of ore from Lake Erie ports during the year ended May 1, 1905, as against 18,739,995 tons for the year ended May 1, 1904, and 21,905,251 tons in the year ended May 1, 1903; 17,216,065 tons in the year ended May 1, 1902; 14,468,260 tons in the year ended May 1, 1901; 15,882,881 tons in the year ended May 1, 1900; 12,122,982 tons in the year ended May 1, 1899, and 10,269,488 tons in the year ended May 1, 1898.

April shipments from upper lake ports this year were 1,195,173 tons and to preserve the comparative value of the May 1 dock figures, the amount of ore on dock April 1 is, therefore, given as follows: Sandusky, 51,233 tons; Cleveland, 741,612 tons; Erie 297,726 tons; Buffalo, 108,058 tons; Lorain, 201,251 tons; Fairport, 503,366 tons; Conneaut, 323,164 tons; Ashtabula, 886,713 tons; Toledo, 104,287 tons; Huron, 100,217 tons; total, 3,317,627 tons.

The following table gives full details of stocks and shipments to furnaces during several years past:

#### IRON ORE ON LAKE ERIE DOCKS—GROSS TONS.

PORTS	OPENING OF NAVIGATION.			CLOSE OF NAVIGATION.		
	May 1, 1905	May 1, 1904	May 1, 1903	Dec. 1, 1904	Dec. 1, 1903	Dec. 1, 1902
Toledo	71,642	160,216	126,331	318,573	106,710	310,023
Sandusky	44,444	68,863	56,500	75,134	95,275	95,175
Huron	68,100	208,008	147,817	182,495	253,249	232,764
Lorain	165,586	237,404	190,811	299,504	288,581	328,304
Cleveland	513,559	968,508	829,347	1,237,033	1,337,750	1,500,604
Fairport	390,869	579,677	555,709	600,420	845,946	924,236
Ashtabula	623,461	1,559,028	1,073,967	1,403,575	1,911,911	1,967,136
Conneaut	96,295	128,018	125,400	684,487	591,304	673,679
Erie	236,414	474,275	427,744	583,439	657,409	722,966
Buffalo	61,271	150,100	60,241	318,730	282,890	319,367
<b>Total</b>	<b>2,271,631</b>	<b>4,534,103</b>	<b>3,592,367</b>	<b>5,763,399</b>	<b>6,371,085</b>	<b>7,074,254</b>

#### ORE ON LAKE ERIE DOCKS, MAY 1, EACH YEAR FOR TEN YEARS PAST.

Year.	Gross tons.	Year.	Gross tons.
1905.....	2,271,631	1900.....	1,720,656
1904.....	4,534,103	1899.....	2,073,254
1903.....	3,592,367	1898.....	3,167,915
1902.....	2,848,194	1897.....	3,256,497
1901.....	3,050,183	1896.....	1,949,698

The whaleback barges 111, 127, 201 and 202, which were sold to the Baltimore & Boston Barge Co. by the Pittsburg Steamship Co., left Erie for the coast last week. The Pittsburg Steamship Co. delivered the boats to the new company at Port Colborne. Five of the barges were fitted with fresh water tanks at the plant of the Great Lakes Engineering Works during the week and will leave for the coast as soon as they have delivered their coal cargoes at Chicago.

#### APRIL COMMERCE OF SAULT STE. MARIE CANAL

The monthly report of Mr. Joseph Ripley, superintendent of the Sault Ste. Marie Canal shows that the Canadian canal opened for commerce on April 10 and the American canal on April 14. Considering the vexatious delays in the ice quite a volume of freight was moved. The report for April is as follows:

EAST BOUND.			
Articles	U. S. Canal	Canadian Canal	Total
Copper, net tons.....	4,829	490	5,319
Grain, bushels.....	1,607,759	37,000	1,644,759
Building stone, net tons.....			
Flour, barrels.....	67,820	75,540	143,360
Iron ore, net tons.....	672,294	134,544	806,838
Iron, pig, net tons.....			
Lumber, M. ft. B. M.....	1,104	126	1,230
Silver ore, net tons.....			
Wheat, bushels.....	1,137,800	784,002	1,921,802
General Mdse., net tons.....	1,396	2,806	4,202
Passengers, number.....	1	35	36
WEST BOUND.			
Coal, hard, net tons.....	121,940		121,940
Coal, soft, net tons.....	183,331	36,271	219,602
Flour, barrels.....			
Grain, bushels.....			
Manufactured iron, net tons.....	1,960	3,582	5,542
Salt, barrels.....	37,196	15,030	52,226
General Mdse., net tons.....	18,723	6,134	24,857
Passengers, number.....	2	165	167
Freight:			
East bound, net tons.....	750,859	169,638	920,497
West bound, net tons.....	331,534	48,135	379,669
Total freight, net tons.....	1,082,393	217,773	1,300,166
Vessel passages, number.....	503	203	706
Registered tonnage, net tons.....	1,033,644	260,565	1,294,209

#### FREIGHT SITUATION

Ore is moving rapidly and indications are that an enormous quantity of it will be moved during May. Shipments during April were 1,195,173 tons. There were no shipments whatever during April of 1904. Notwithstanding the fact that both the coal and grain trades are light vessels are having little trouble in getting ore cargoes, dispatch at upper lake ports being excellent. Coal shippers say that until the coal docks at upper lake ports are in better shape the movement of coal will not be heavy. At present cargoes are especially scarce and a number of coal carriers are going up light. Ore is bearing the brunt of the whole lake trade and no improvement can be expected in the general tone of the market until the other trades stiffen. Grain rates are not firm and the line boats are taking up all that is offered.

#### NEW STEAMER FOR CAPT. W. C. RICHARDSON

Capt. W. C. Richardson of Cleveland closed a contract with the American Ship Building Co. last week for a freight steamer for 1906 delivery. She will be a duplicate of the Ball Brothers which was recently constructed at the Lorain yard for Mr. G. A. Tomlinson of Duluth and will therefore be 500 ft. over all, 480 ft. keel, 52 ft. beam and 30 ft. deep. She will have triple-expansion engines with cylinders 22½, 36 and 60 in. diameters by 42 in. stroke, supplied with steam from two Scotch boilers, 13 ft. 9 in. diameter and 11 ft. 6 in. long. Her carrying capacity will be 8,000 tons.

The steamer Hesper of the Bradley fleet went ashore at Beaver's Bay on the northern shore of Lake Superior last week while enroute to Two Harbors without cargo. Capt. Heaton wired that the crew had reached shore safely but the steamer herself was so badly pounded that she became a total wreck. The Hesper was built at Cleveland by the Ship Owners' Dry Dock Co. in 1890 and had a carrying capacity of 2,500 gross tons. She had been turned over by Mr. Bradley to C. E. Graves and other stockholders at the opening of the season and was being managed by Hutchinson & Co. She was insured for \$50,000.

## LAUNCH OF THE HOOVER &amp; MASON



MRS. F. K. HOOVER.

The launch of the hull of the new steamer Hoover & Mason, at the Ecorse yards of the Great Lakes Engineering Works, last Saturday marked the introduction of the most radical departure in marine construction on the lakes since the adoption of the arch system and longitudinal hoppers. Another feature in the new boat is the hatch arrangement, the 12-ft. centers system applied to the latest boats having been disregarded for the 24-ft. centers, the boat having sixteen hatches over the cargo hold, aside from the bunker hatch.

The radical feature in the construction of the Hoover & Mason is the installation

of athwartship or transverse hoppers, sixteen in number. These hoppers, which virtually form bulkheads or girders, from skin to skin of the ship, connecting the points of greatest strength and transferring the weight of the cargo from the bottom and frames, and distributing it more evenly, have the appearance in the hold of immense corrugations in the tank top of the ship's water - bottom. Each hopper, the center of which is directly under the center of the hatch opening in the deck, is 2½ ft. wide at the top, 6 ft. 9 in. at the bottom and 13 ft. deep.

Shipbuilders and ship owners, during more recent years have sought to secure quick dispatch at unloading docks. The capacity of

a ship during the season of navigation is governed not so much by its own size as by the loading and unloading facilities. For the Hoover & Mason her designers, Hoover & Mason, constructing engineers, of Chicago, claim a cargo of 9,000 tons may be unloaded in 2½ hours, or nearly one-half the time consumed when the existing record was made on the Augustus B. Wolvin, at Conneaut.

The incline of the hopper sides trims the cargo to the common center of each hopper and makes it easily accessible to the operations of the clam-shell unloading machines. False plates from the shell of the ship run inboard between the athwartship hopper sides making the hopper complete. For the new type of construction it is claimed shovellers will never



MR. G. A. TOMLINSON.

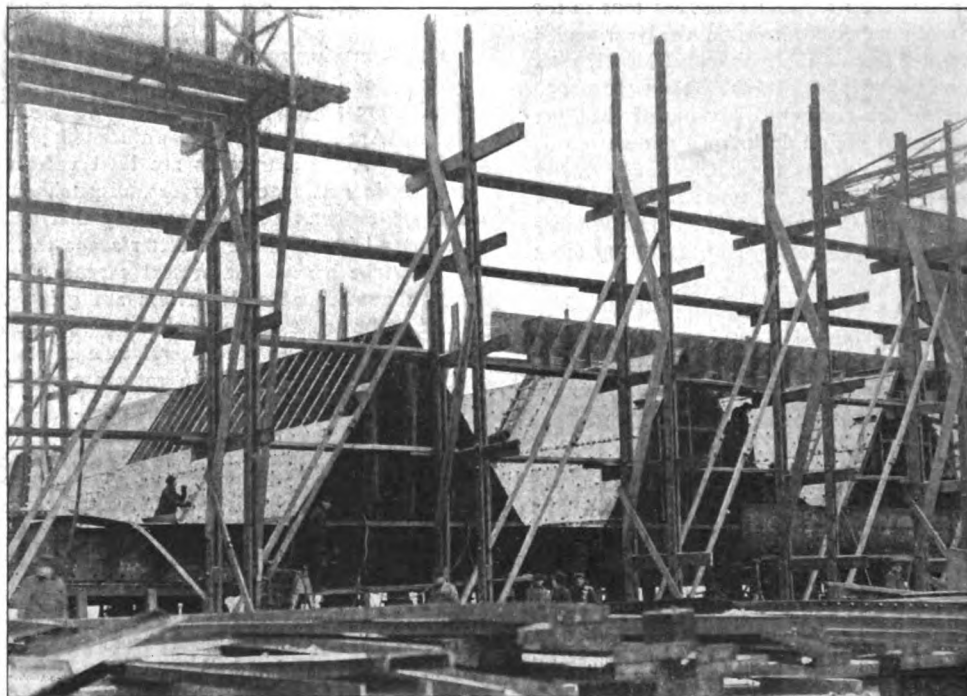
be needed in the hold to clean up after the clamshells.

The other departures from what, during the past two years has been accepted as the most modern construction are the adoption of the old style deck beams instead of the arch construction and the abandonment of the double-sides, or double hull and instead of the vertical or straight side tanks which in other late ships is a part of the water bottom, the inside of the hopper peaks answers this purpose in the Hoover & Mason.

The general dimensions of the new boat are: 524 ft. over all, 504 ft. keel, 54 ft. beam and 30 ft. moulded depth. She is being constructed for the Zenith Steamship Co., one of the

Tomlinson interests and will have a quadruple - expansion engine, with cylinder diameters 18, 27, 40, 62 x 42 in. stroke. The Niclausse water tube boilers 13 x 9, 250 lb. pressure and induced draft will be installed.

Clouds of rain which were in evidence practically all day were direct contradictions to the proverbial "great lakes weather" but both held off while the ceremonies were in



CONSTRUCTIVE VIEW OF THE HOOVER &amp; MASON.

progress. Mrs. F. K. Hoover, wife of one of the designers for whom the boat was named christened the ship, being attended by her sister Mrs. Gertrude Hunrie, of Chicago. The launching party consisted of Mr. and Mrs. F. K. Hoover, Earl and Ray Hoover and Mrs. Gertrude Hunrie, of Chicago; D. P. Fridley, Minneapolis; G. A. Tomlinson, Duluth; S. J. Tomlinson, Pontiac, Mich.; Harvey D. Goulder, W. H. McGean, Cleveland; Capt. J. J. Brown, Buffalo; J. C. Siedle, Erie; H. B. Ledyard, Alexander McPherson, Theo. Buhl, Mr. and Mrs. Henry Russel, A. C. Pessano, Mrs. H. M. Campbell, Mrs. C. A. Ducharme, Detroit; Capt. Jos. Kidd, Duluth, and Eugene T. Barry. Mr. Barry represented Chas. E. A. & W. F. Peck, insurance brokers, of New York. The invited guests went



to and from the shipyard on the steamer *Pleasure*.

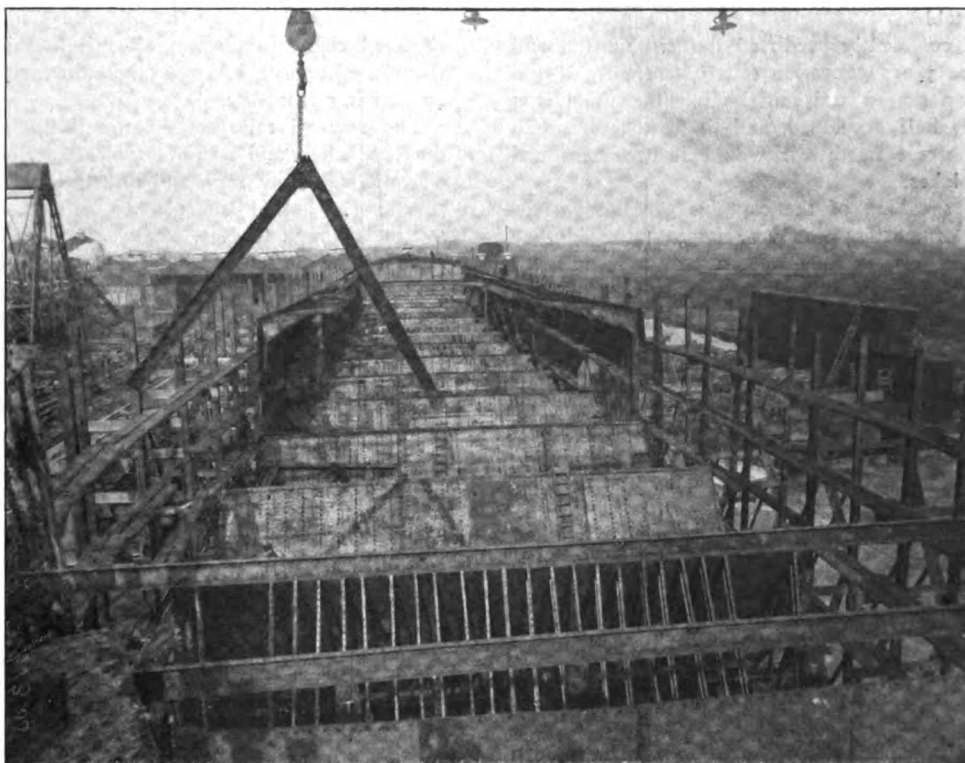
A banquet at the Detroit Club followed the launch. President A. C. Pessano, of the Great Lakes Engineering Works was toastmaster. Mr. Tomlinson and Harvey D. Goulder sat to his right and F. K. Hoover, S. J. Tomlinson and Jas. E. Davidson, at his left. In response to the toastmaster's request for a word of grace Geo. H. Russel responded, "In a crowd such as this, God help us." After a few introductory remarks by Mr. Pessano, Mr. Goulder proposed this toast to the Great Lakes Engineering Works and Mr. Tomlinson. "May they well and favorably

know Dame Fortune, and never become acquainted with her daughter, Mis-fortune."

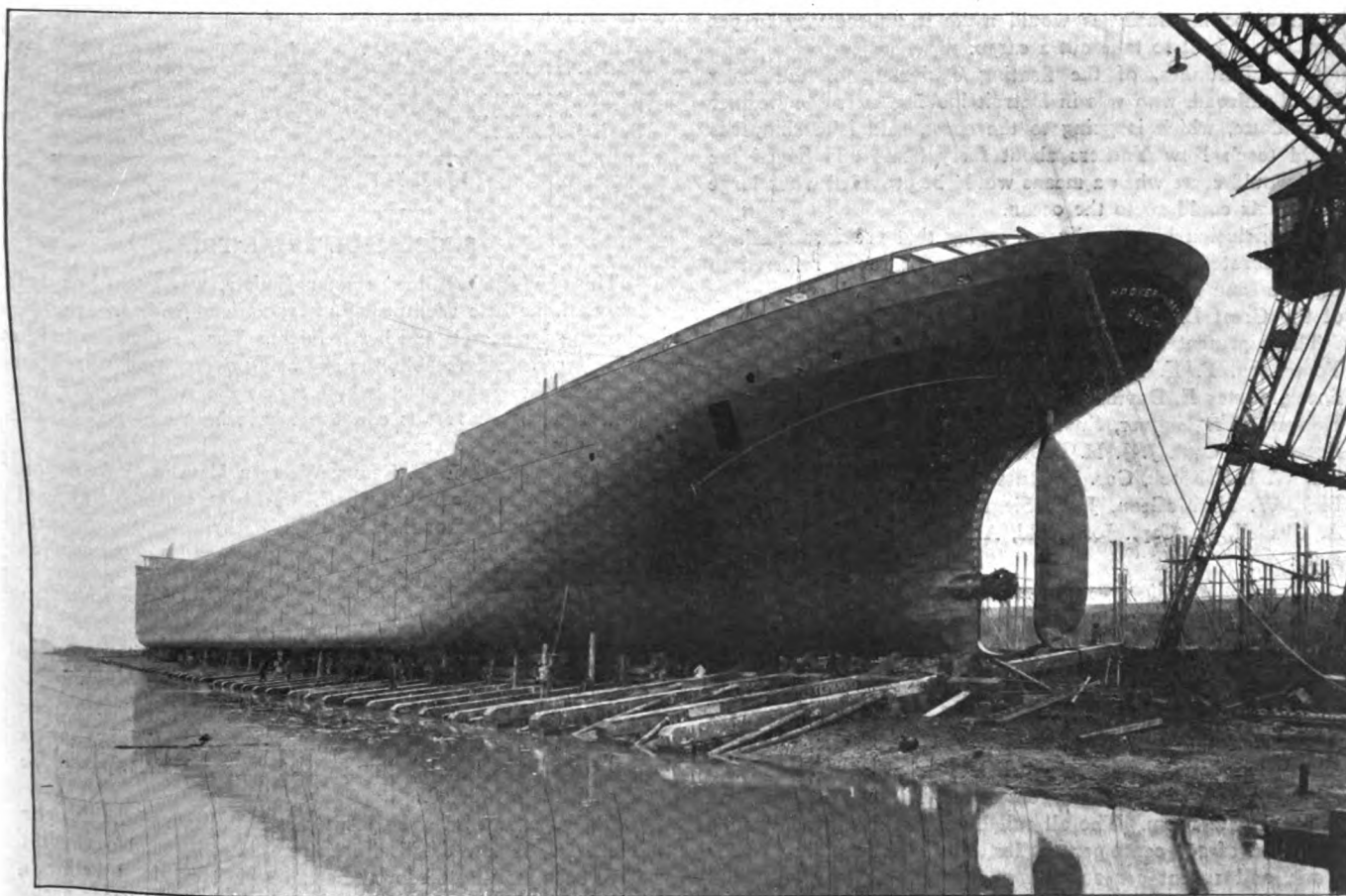
F. K. Hoover said the outgrowth of progress in the lake transportation business was the problem of how to unload a boat the quickest, and this had resolved itself into the venture embodied in the new Tomlinson boat.

James E. Davidson, "Peerless Orator from the Saginaw Valley," said he expected criticism on the plans of the new boat be-

cause it was different from anything else—all new things are criticised, but he thought that in the Hoover & Mason they had the practical ship that could be unloaded at the



A LONGITUDINAL VIEW FROM OVERHEAD OF THE HOOVER & MASON.



THE HOOVER & MASON ON THE STOCKS JUST PRIOR TO THE LAUNCH.

(Photo by Detroit Photographic Co.)

minimum cost. Incidentally he threw a few verbal bouquets to those about the table.

Geo. H. Russel confidently predicted that within ten and possibly within five years 50,000,000 tons of iron ore would be carried during a season and said he felt the allied iron interests were only half developed, and these, together with the crops of the great northwest would insure continued prosperity on the lakes.

Mr. Tomlinson, speaking of the captains of lake vessels, said the question of masters was very important, said they were sometimes naughty, as they were a year ago, and had to be spanked, but "his boys," as he spoke of Capt. W. D. Ames and Capt. Fick, who sat at the table, he said had caused him less annoyance, fewer hardships and more satisfaction than any other men in his service. He then spoke of one man in particular, of his sterling qualities, faithfulness and watchfulness, a representative of the old regime—that it was fashionable now for owners to look for younger men—and he introduced Capt. Fick, who is to sail the new steamer Jas. E. Davidson. Capt. Fick spoke briefly.

Henry Russel toasted the Hoover & Mason to continued prosperity, favoring gales and good business, and drank to the men who did so much to hold up the commerce of the country. He paid a tribute to Mr. Goulder and Capt. Kidd and spoke of the relative freedom of lake commerce as compared with the restrictions surrounding the operation of railroads. He spoke of vessel owners as men of freedom and liberty. John A. Ubsdell, Jr., and Henry Penton spoke as representatives of the Great Lakes Engineering Works, W. H. McGean made a neat speech, taking up a former reference to Mr. Tomlinson as king of the lakes; said the Great Lakes yards was the queen and hoped the two leaders would soon arrange for another ship.

Capt. Kidd said he had two ambitions, one to see the 15,000-ton boat, and another that he would live to see the time when unloading facilities would make it unnecessary to put men into a boat to take out a cargo.

Supt. Desanges, of the floating equipment of the Long Island railroad, who was in Detroit looking after the steamer Wyandotte, which is going to the coast, said lake shipyards could teach New Yorkers about ferry boats and hoped the time would come when a means would be provided when large lake boats could go to the ocean.

In conclusion Mr. Tomlinson, saying that previous speakers had decorated each other with rosettes of roses, referred to Mr. Pessano as the smooth, guileless and gentle personality of the Great Lakes Engineering Works.

Those present at the banquet were: A. C. Pessano, G. A. Tomlinson, F. K. Hoover, Harvey D. Goulder, S. J. Tomlinson, James E. Davidson, Elias Gunnell, H. W. Russel, Ray Hoover, Earl Hoover, Supt. Desanges, Jere Hutchins, H. C. Potter, Jr., Capt. J. J. H. Brown, Henry Russel, Henry Penton, W. I. Babcock, Geo. H. Russel, Capt. W. D. Ames, Capt. Fick, W. H. McGean, J. C. Siegle, Eugene T. Barry, John A. Ubsdell, Jr., Capt. Jos. Kidd, Alex. McPherson and Theo. Buhl.

### CHICAGO GRAIN REPORT

CHICAGO, May 9.—The going rate basis is substantially unchanged from previous weekly reports, namely, 1 cent Buffalo and Georgian Bay corn with Montreal, all water routing, reported nominally at 4c per bushel. It is noticeable, however, that carriers are more evenly distributed and while there is no especial shipping activity cargoes are now somewhat in excess of immediate room. The all rail lines having agreed upon a reduction of 2½ cents per 100 lbs. on domestic grain to New York, and 1 cent per 100 lbs. on export. It may be stated this action appears not calculated to seriously affect the natural current of wheat and corn business via lake routing. But

this reduction stands to affect the nearly movement in oats out of Chicago in quite the opposite manner. A comparison of fixed charges indicates all rail interests to have settled themselves upon a basis of minimum carrying charges in this particular commodity.

The new all rail prices figure through to New York on domestic wheat and corn at 8.40 cents per bushel and 4.80 cents on oats. On New York and Boston export wheat and corn at 7 cents per bushel and 4 cents on oats. The lake and rail routing through to New York figures on basis of going lake rates to the vessel—plus the charge per bushel at and east of Lake Erie port to seaboard of 5 cents wheat, 3½ cents corn and 3 cents oats. It will be readily noted, therefore, upon a natural competing basis, just to what extent this new rail arrangement concerns the lake carrier.

Following will be noted the comparative figures of weekly shipments and grain stocks:

LAKE AND RAIL SHIPMENTS.			
	This week.	Last week.	Same week last year.
Wheat .....	530,714	72,281	170,873
Corn .....	2,038,357	1,658,288	730,438
Oats .....	913,438	902,522	713,218
Rye .....	8,351	10,207	24,418
Barley .....	73,950	147,719	74,248
	3,564,810	2,881,077	1,728,195
Shipments since Jan. 1, 1905.			
			Same time last year.
Wheat .....	4,401,045		4,213,115
Corn .....	20,008,500		15,554,484
Oats .....	16,000,528		17,233,003
Rye .....	505,287		651,824
Barley .....	1,003,226		2,287,543
	52,517,646		39,940,500

STOCKS IN PRIVATE AND PUBLIC ELEVATORS.			
	This week.	Last week.	Same week last year.
Wheat .....	4,057,000	4,410,000	4,311,000
Corn .....	4,602,000	6,207,000	8,314,000
Oats .....	4,670,000	5,307,000	3,303,000
Rye .....	150,000	141,000	412,000
Barley .....	41,714	60,714	353,000
	13,535,714	16,215,714	16,783,000

### SUCCESSFUL TRIAL TRIP

The new Anchor line steamer Juniata, was given her trial trip on Lake Erie Wednesday afternoon and made an excellent showing for herself and her builders. The weather conditions were far from agreeable, the sky being overcast and threatening rain the entire time, but as far as the steamer itself was concerned better results could not have been expected by the most sanguine.

Vice President E. T. Evans, Western Manager J. C. Evans, General Passenger Agent C. E. Markham, and other general officers of the Anchor line, Frank E. Kirby, several representatives of the American Ship Building Co., and a small number of guests were aboard for the trip.

The machinery of the new boat worked to perfection and the main engine was turned as high as 110 revolutions per minute without a show of heating. The average number of turns on the trial was about 95 per minute.

The new boat will be delivered to the Anchor line Sunday morning, and she will immediately start for Chicago for a cargo of 4,000 tons of flour. The first regular trip will be from Buffalo May 28.

Along general lines the Juniata is a duplicate of the steamer Tionesta. A few details have been altered, round deadlights have been substituted for the square windows along the berth deck, six parlor suites have been placed on the upper deck, just aft the texas, but otherwise the boats are sisterships.



**STEAMER WYANDOTTE IN DRY DOCK**

The steamer Wyandotte, recently sold by the Clark estate, of Detroit, to the Long Island railroad, to be operated between the eastern terminal of the road and Block island, was the first steamer to be lifted by the new floating dock of the Great Lakes Engineering Works,

at Ecorse, Mich.

The cabins are being thoroughly overhauled and rebuilt to suit the new service and extensive machinery repairs will be made. As soon as these are completed the boat will start for the coast by way of the St. Lawrence river and Canadian canals. The accompanying illustration shows the Wyandotte in the floating dry-dock. While in



STEAMER WYANDOTTE IN FLOATING DRY DOCK AT GREAT LAKES ENGINEERING WORKS.

commission on the lakes the steamer ran for many years between Detroit, Amherstburg and Sugar island and last season was in the excursion business out of Buffalo.

**NEW STEAMER FOR D. AND C. LINE**

The constantly increasing freight and passenger business and the brisk competition of steam and electric railroads, has decided the Detroit & Cleveland Navigation Co., to build a new steamer of a new type on the lakes. President and General Manager W. C. McMillan and Supt. A. A. Schantz have commissioned Frank E. Kirby to design a boat with a carrying capacity of 1,000 tons of freight, 4,000 passengers, 300 state-rooms and all modern equipment and appliances, the total cost to be about \$800,000. A building berth with the American Ship Building Co., has been reserved at the Wyandotte yards, with the understanding, however, that the option is not an agreement that this company must receive the contract. Mr. Kirby has suggested the construction of a fast twin screw propeller with guards. This type of boat would have practically all the advantages of a propeller and a sidewheeler as well, the guards giving the deck and cabin space, so absolutely essential for a boat on this route.

The new boat will make three steamers in the D. & C. line between Detroit and Cleveland. During the summer excursions, when the City of Cleveland and City of Detroit give double daily service, a day and a night run, every 24 hours, the freight cannot be handled on account of the limited time in port at each terminal. A third boat would allow one to remain in port each day to clean up the freight accumulations while the remaining two transacted the regular business.

**THE 15,000-TON SHIP**

Since the construction of the steamer Augustus B. Wolvin a year ago, and the establishment by that boat, of new records in the coal and ore trades the prediction has frequently been made that the time of the boat carrying 15,000 tons of ore or coal on the great lakes is not far distant. President Coulbey,

of the Pittsburg Steamship Co., and J. H. Sheadle, of the Cleveland Cliffs Iron Co., made the statement at the last annual meeting of the Lake Carriers' Association, at Detroit, it has been repeated by others since that time and prominent ship builders and vessel owners at the banquet following

the launch of the steamer Hoover & Mason at Detroit last Saturday said it was their ambition to see such a ship before they passed into the great beyond.

The modern coarse freighter on the lakes, according to ship builders, is about 90 per cent box, their calculations being that but 10 per cent of the ship is given to fine lines, overhang, machinery space and quarters. The greatest question

which confronts the builders in the construction of ships larger than those now in operation or under contract, is the increased weight of material in order to give strength and stability on the limited draught of the lakes.

Loading and unloading facilities also enter into the proposition on the part of shippers and owners. The annual carrying capacity of any ship, no matter what her size may be, is limited to the shore facilities to load and unload her cargoes. With quick dispatch at modern docks a 10,000-ton cargo may now be handled in less time than a 5,000-ton cargo was taken out five years ago. On the other hand, however, if dock facilities are not increased in pace with the construction of larger ships and modern devices to facilitate the unloading machinery, the aim of owners and builders in seeking to avoid delay and provide means for reducing unloading time and charges to a minimum, will be of no avail.

**PERSONAL**

Mr. Henry Steinbrenner, manager of the Kinsman Transit Co., whose offices are in the Wick block, will remove to the fourteenth floor of the Rockefeller building as soon as that building is ready for occupancy.

Mr. John J. Wardwell, master builder of the Cobb-Butler ship yard at Rockland, Me., has the reputation of turning out the fastest schooners on the Atlantic coast. Mr. Wardwell comes from a race of ship builders.

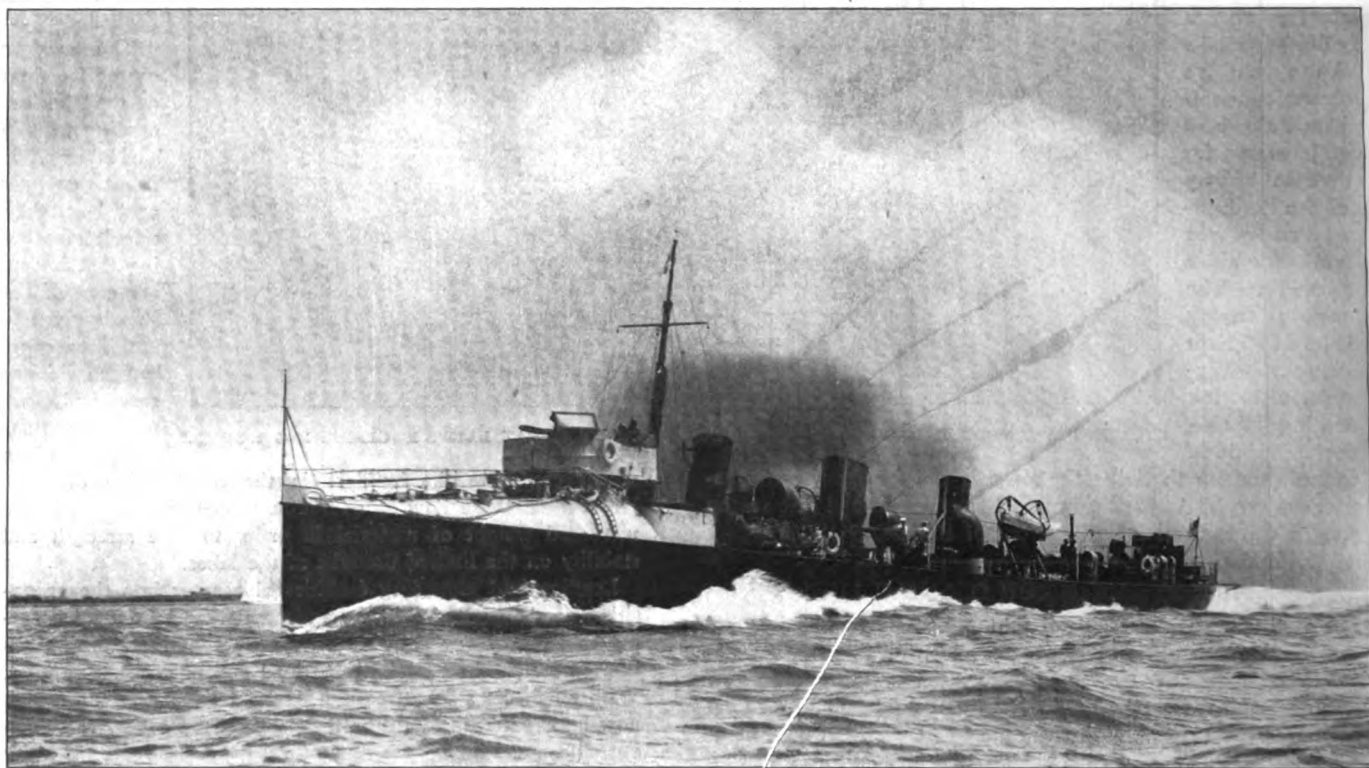
A. Piers, general manager of the Canadian Pacific Steamship Line, returned from England last week, where he went to look into the construction of the new liners which are being built for the Canadian Pacific service.

Mr. S. G. Jenks of the Port Huron Ship Building Co. was in Cleveland this week. Mr. Jenks said that the company expects to have its plant completely modernized by fall, but that for the present they are devoting their attention to the enlargement of the dry dock. Even this work has been temporarily delayed by the extraordinary number of repair jobs on hand caused by encounters with ice.

## Some Notes and Recollections of Destroyer Trials

Mr. A. H. Finch has an interesting article on the above subject in the *Mid Tyne Link*. These business-like, vicious-looking sea-sprinters have been familiar objects on the Tyne ever since their first introduction in 1893. But though a view from the shore is interesting—under certain circumstances even picturesque—the general aspect of the interior is a very different matter; and it may well happen that there are many who have not witnessed in strenuous operation the turbulent vitals which our destroyers conceal within their black shells. These craft, though varying in details such as the number and position of their funnels, are all of approximately the same

On her trial trip she is called upon to race her hardest. Let us now consider that it is the day before such a test, and the ship is being prepared for the ordeal. The needful energy, in the shape of 35 tons of coal, is got into the bunkers. The firemen scatter over the shipyard to collect wood for lighting their fires on the next day; the shipyard authorities, aware of the coming trial, are alert to discover and invoice to the Engine Works such harmless acquisition, which they regard as depredation. A list of the work allotted to each man or apprentice is made out, and it is his business to see that his engine or his particular portion of engine, or his firing tools,



BRITISH TORPEDO BOAT WHITING.

[Built by P. Imers Ship Building & Iron Co., Yarrow

lineal dimensions, viz.: 210 ft. over all, 21 ft. beam and 5 to 6 ft. in draught, with a speed of 30 knots and a tonnage of 300.

The latest type (of which the *Eden*, engines by the Parsons Marine Steam Turbine Co., is an example) have a raised fore-castle, heavier scantlings and reduced speed; but still the most numerous class are those depicted in the adjoining cuts, and to them most of the present remarks will apply. On glancing at the above figures, one cannot fail to be struck by the huge proportion of horse-power to tonnage; 6,000 H. P. to 300 tons is 20 per ton. Compare this with the first class battleship *Russell*, whose indicated horse power of 18,229 is at the rate of 1.3 per ton; or with the *Ivernia*, where the similar ratio is .7, and it will readily be understood that to control such tremendous comparative energy requires the closest attention and presence of mind on the part of those charged with the ship's navigation and propulsion.

To this enormous preponderance of horse-power over tonnage are due those encounters with the dock wall (or each other) of which we still read from time to time. But 30 knots calls for no sparing hand in the design of the engine-room and a ship intended to race may well discover an awkwardness in slow marching.

or his lamps, are all in order, that the nuts are tight on the bolts, that the split pins are split, the oiling apparatus in proper working trim, the oil tanks full; for woe to him if his negligence results in a breakdown, or even temporary stoppage, of the machinery.

The boilers are filled from the hose on shore to their proper working level, the reserve tanks as full as they will hold. The steward for the occasion gets in his supply of 1-in. bread and ½-in. meat (the standard mouth is taken at 2½ in.), casks of beer for the honest workers, ginger-bread for the teetotal, lint for the wounded. The raw hand has the fear of death instilled into him by his chargeman, enforced by the moral effect of a 7/8-in. spanner, and an intimation that if he sleeps in next morning he will not only "lost his ticket," but will get his head, or number, or something equally anomalous, "chowed to ribbons."

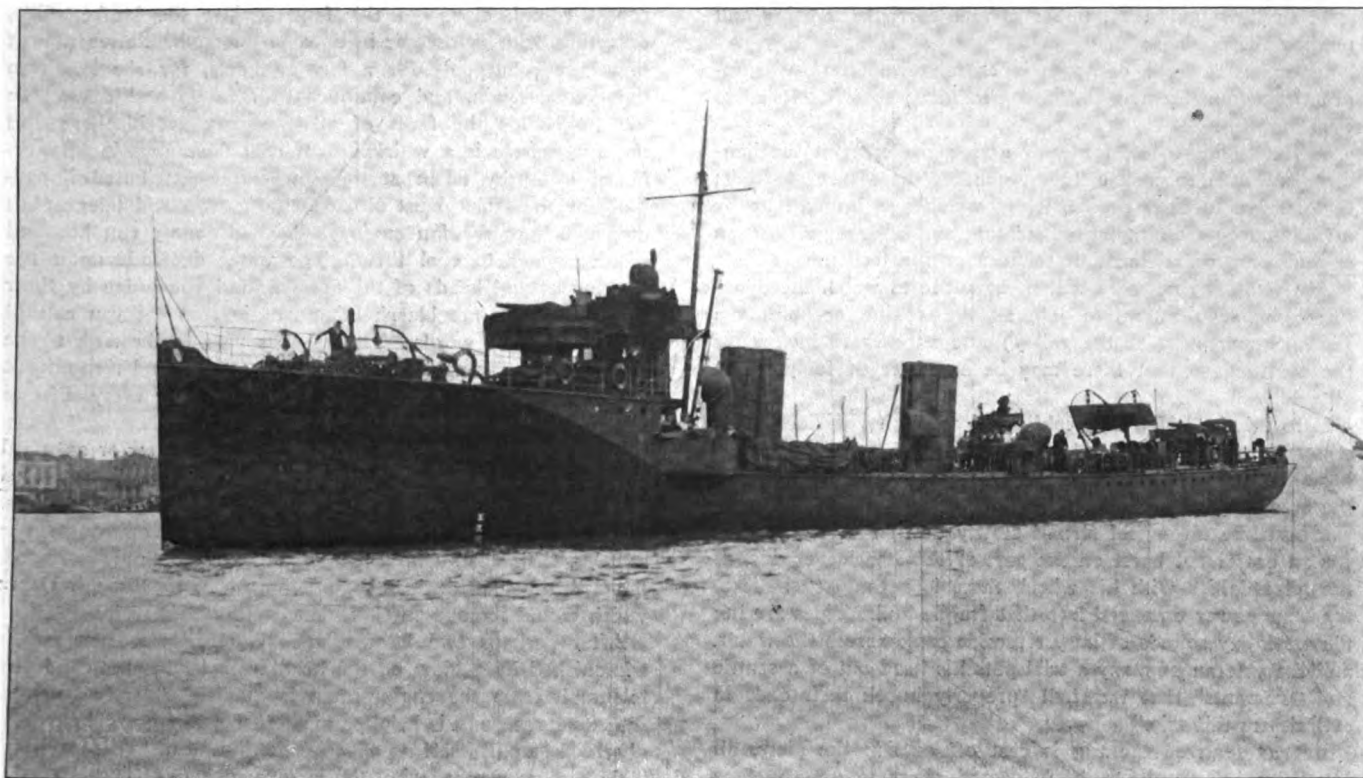
At 6 o'clock, accordingly, the crew present themselves. If the pilot-house at the mouth of the river reports the state of the weather outside the bar satisfactory, down comes the order to get the fires away, which is accomplished by large lumps of waste soaked in paraffin; and the business begins. While steam is being raised the hands not immediately required to watch the fires go ashore and get their breakfast.



Let it be a good one—possibly it's the last they will enjoy with ten fingers.

Wonderful are water-tube boilers. Steam pressure shows in the gauges half an hour after the fires are lit, and the

fro; with further coaxing of the starting valve the cylinders become warm enough to give the steam a chance, and the crank shaft begins to revolve spasmodically, half a turn ahead, half a turn astern, as the links travel over. When all



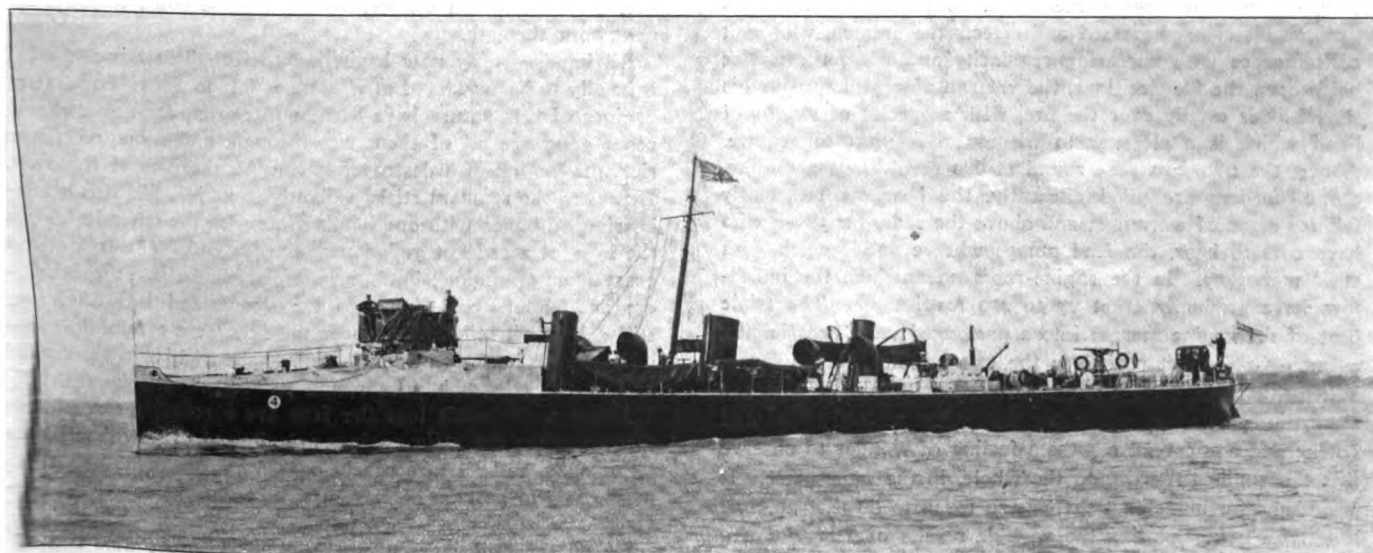
BRITISH TORPEDO BOAT DESTROYER EXE.

*[Built by Palmers Ship Building & Iron Co., Yarrow.]*

firemen assure you that twenty minutes is really sufficient. When fifty pounds of steam is reached the circulating pumps are set away; these are the first to start and the last to stop for the condensers cannot be used without them. By this

is thoroughly hot the engine will be allowed to make a few complete revolutions, ahead and astern, and may then be considered fit for business.

All being in readiness below, the pilot (in a new water-



BRITISH TORPEDO BOAT DESTROYER LIGHTNING.

*[Built by Palmers Ship Building & Iron Co., Yarrow.]*

time, too, as it is getting hot in the stockholds, the fan engines are warmed through and started at a slow rate, sufficient to keep the air on the move.

The main engines are next got ready for work; the reversing-engine having been started, the links travel slowly to and

proof), admiralty officials and responsible representatives of the builders come aboard, the shore hands heave the gangway clear and cast off the moorings, while the tug hauls her head round and starts down the river. "Slow ahead" is rung down to the engine-room, and the propellers begin to

revolve—only fast enough to keep them turning or else the vessel rams the stern of the tug. The hands for the most part remain on deck while she proceeds down the river, enjoying the last of the fresh air before they descend for the three-hour spell.

The following is the number of men carried for firing and tending the engines:

In each stokehold, one man in charge, two fitters, two apprentices, four firemen and two trimmers; that is, eleven to each stokehold.

In the engine-room, for each engine, one man at the handles, one man to each cylinder, one for the thrust shafting; that is, five to each engine, which number is brought up by attendants on the circulating, steering and bilge engines to an engine-room complement of thirteen or fourteen men.

Abaft the engine-room will be someone to watch the dynamo-engine (an attractive job, as the engine occupies the same compartment as the galley) and another to look after the shafting, so that there may be a matter of forty hands all told.

If to this be added a sprinkling of admiralty officials (with stiff collars and stop watches), and the indicator staff broiling on the top of the engines, it will be easily understood that the amount of accommodation for visitors is limited.

Meanwhile the vessel steams slowly down the river. Save for an occasional burst on the part of the steering engine, as the pilot dallies with his wheel, there is nothing to indicate the huge power crammed into that fragile hull. Pipes are lit; the work-day sounds of busy riverside come across the water, and the veteran of many a trial puts his head out of a scuttle and "warrants" that we shall "properly knock their ends in at Palmers this trip."

But as soon as the tug is cast off outside the piers, all hands go below; the word is passed along to get the fires ready; the stokehold scuttles are battened down, and the fans worked up. As steam rises, the big main regulator valves are opened, little by little, and volcanic rumbles periodically shake the whole ship. At last the 250 lbs. is reached, the valves opened wide, and she takes a flying start at the measured mile. Now observe the chargeman in the stokehold stand, with his hand on the fan-regulator, his eye on the gauges, his foot among the coals. He inspects the fires through his colored glasses, and directs the firemen, who visit each furnace with unceasing regularity and while the novice holds open the furnace-door, the veteran aforesaid spreads his shovel-loads evenly over the fire, with a species of sleight of hand which is a pleasure to witness, a fine art to acquire. Above, the two fans race round at 600 revolutions a minute, the oil-feeders are plied diligently, the bearings religiously felt for signs of warming; and above the roar, for those who have ears to hear, the feed pumps wheeze and squelch with staid monotony. In the engine-room, meanwhile, the indicators have gradually crept up to 400 revolutions. The triple beat of the engine merges into a prolonged roar, occasionally assuming a distinct period as the two engines get into step. When this is the case, it is felt throughout the whole ship, the stern, in particular, appearing to jump violently up and down; and one cannot repress a feeling of wonder to observe that the engines remain, on the whole, in the same place. It is perhaps fortunate that there is so much to do that no time is left for contemplating the possible results of a breakdown. Each man is fully occupied with his own portion of the engine; he must see that every moving part of it gets oil somehow, even if it comes to the quart pot flung at the maze with a "Share that among you." Any heated bearing has to be detected at once and reported; the water service is turned on, and if serious, the spare man comes along with a hose and plays upon it. The engine-room hands are soon drenched with oil and sea-water; and this compound fills the mouth,

is flung in the eyes, and in the form of haze constitutes a large part of the atmosphere.

In two minutes the end of the mile is reached; the steering engine for the moment takes charge, and the whole vessel heels as she swings round to repeat the course. As she comes round, clang go the fans against the bunker side, objecting, with gyroscopic instinct, to this sudden alteration of their axes; but only for a few moments, for she is on to the course again, and continues to race up and down. In the stokeholds the faces of all gradually get blacker; and the atmosphere is a whirlwind of coal dust, occasionally relieved by spray taken at the cowls and distributed impartially by the fans. Dust obscures the gauges and telegraphs; dust gets into the fan engines, which promptly run hot and require water to cool them. The water descends upon the bare necks and heads of the firemen, and you judge by their faces that they are blaspheming, but in that din you cannot hear the mystic words. The oil-cans pass to the tank to be filled, and empty again at a miraculous rate; and throughout the hurly-burly a record has to be entered every fifteen minutes of the pressures, temperatures, etc.

At half time buckets are lowered containing beer or oatmeal water; but all sense of taste has long since vanished, and only the refreshing fact that the beverage is liquid remains. From time to time the admiralty officials appear through the scuttles, their coats over their heads and caps firmly gripped, for with the scuttles open there is a rush of air through them which would remove anything but a permanent scalp.

After perhaps two hours someone happens to see, or is admonished by a blow on the head from its handle, that the telegraph from the engine-room is moving violently to and fro; its large gong is helpless in the babel of sounds, but it is observed to pull itself up opposite the legend of "Voice Pipe." This communicates with the engine-room. Owing to the excess of air pressure in stokehold over that of the engine-room, the first warning which the man at the far end has of his summons being answered is a terrific blast of coal dust, which if incautious, he receives in ear or mouth, according to circumstances. After diligent application to the pipe the man in charge of the stokehold chalks up on the boiler front the figures 30.9, whereat as much enthusiasm is exhibited as coal-black faces can convey, and you settle down to see the next hour through.

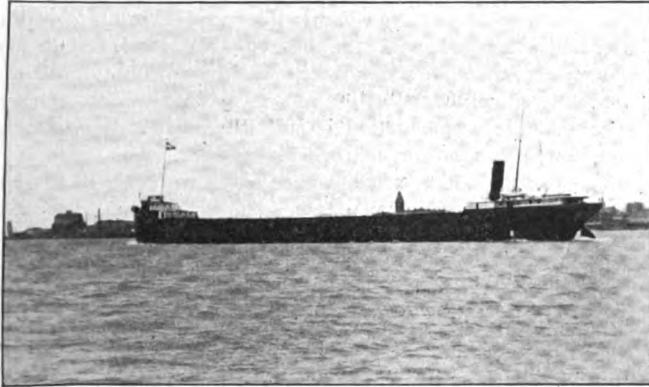
All hands are by now beginning to feel the strain; and it is hardly to be wondered at if more is left to Providence than engines of this nature have a right to expect, for the engine-room gang are all of them wet through, and some of them sick, the motion of a destroyer having peculiarities of its own. However, the remnant sticks valiantly to its job, fills the main-bearing oil-boxes with one hand, while with the other it levels the hose at a red hot gudgeon at the far end. The trimmers cease from trimming; but someone else climbs into the bunkers and shoots coal down to the doors, and Bill Christie still delivers it scientifically over the fires, as a careful housewife spreads butter on a loaf. And so the trial bangs on, until at last the telegraph goes round to "Stop." Infinite relief! Without a moment's loss the fans are checked, the scuttles thrown open; the main engines are allowed to slow down as steam falls, and all who can be spared swarm forward to the mess-room to partake of refreshments and compare notes and faces.

Up on the bridge the pilot shows you how the wind made by the ship has torn a large patch out of the new waterproof; and if you are on good terms with him, and sympathize duly, he will let you take the helm for a bit and cruise about, shaving the bows of the slower shipping while steam is being run down, for it would never do to enter the river with full-speed energy still bottled up in the boilers. Then you go and listen to the marvelous accounts of the deck hands; how her funnels flared and became red hot or shot solid

lumps of coal into the air, which littered the after decks; how she steamed 33 and 7 decimals—"they had it from the Inspector himself"; and how Mr. McGinty lost his spectacles and three caps overboard.

And now the pace is sufficiently covered to enable her to thread her way up the river, which she does gingerly, with frequent stoppages and much blowing of the siren; in particular, three or four defiant hoots as you pass Jarrow, more blowing to summon the shore hands; and then "Slow ahead" becomes "Slow astern," "Stop," "Finished with engines." The trial is done.

I have attempted in these pages to indicate something of the spirit in which these trials are carried out, and something of the strain which they entail upon all concerned. It is just for



THE NEW STEAMER AMASA STONE ON HER INITIAL TRIP.

lack of knowledge of the circumstances under which this section of the fleet has to work that stay-at-home grumblers are chronically apt to abuse designers' officers, men and ships alike; and the best possible thing that could overtake these people is that they should trim coal for four or five hours in a bunker 3 ft. wide.

In conclusion, I hope that I have not indulged needlessly in technicalities. But there is no denying that in a vessel which is little else but machinery from stem to stern, it is impossible to avoid mention of a cylinder. His Majesty's destroyers are not all romance.

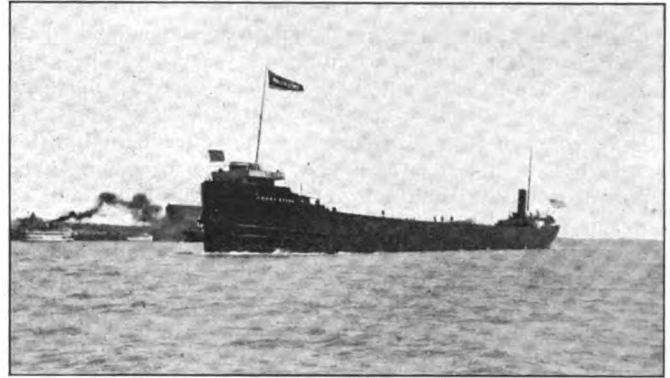
#### INITIAL TRIP OF THE AMASA STONE

The steamer Amasa Stone, built at Wyandotte and fitted out at Detroit, made her first run last Sunday morning when she left the plant of the Detroit Ship Building Co., and cleared for Toledo, where she will load coal for the head of the lakes. Capt. Geo. B. Mallory is master of the Amasa Stone. Everything on the boat worked to the complete satisfaction of those on board, the guests including President Coulby of the Pittsburg Steamship Co., President A. C. Pessano of the Great Lakes Engineering Works, Henry Penton of the Great Lakes, C. B. Calder of the Detroit Ship Building Co., Elias Gunnell, manager of the Manitowoc Drydock Co., W. I. Babcock of New York, Capt. J. W. Westcott, J. P. Cottrell, F. B. Smith, chief engineer of the Pittsburg Steamship Co., and Capt. Ralph Lyons. The accompanying illustrations show the new steamer, which measures 545 feet over all as she passed the foot of Woodward avenue, Detroit, bound from Toledo.

#### AT HEAD OF THE LAKES

Duluth, May 10.—Quite a sensational statement has been made in a complaint by the Duluth grain firm of A. D. Thomson & Co. against the Peavey company. May 1 about 500,000 bu. of contract wheat delivered to Thomson by the Peavey company, on sales it had previously made him, and the storage receipts transferred called for the grain in the

Peavey concrete warehouse, on Rices Point. Now this house had broken in at two different times some years ago and Mr. Thomson took the occasion to protest against the house as a "regular" elevator from which receipts must be accepted by any member of the Duluth board of trade. It was made regular by the Duluth board some years ago, subsequent to the breaks referred to. He demanded that the board take action to rescind its action and at once ordered cars there to transfer the wheat he had bought into other houses—in which, by the way, he was interested as supervisory manager. This week, Monday, he filed additional complaints, and demanded that the board take action immediately for the house had never been regularly licensed by the state, nor had it filed a bond with the warehouse commission as required by law,



under a penalty of \$50 for each day it might be operated without license and bond. The Peavey company has always considered this house as a mere annex to its regular wood working house of the Peavey Duluth Terminal, and probably does not consider that a license is requisite for each. Thomson is moving the wheat he has taken under delivery into the Great Northern elevator, and a good deal of stuff has been moved around the harbor from that house to make room for it. The controversy is rather an acute one, and is not pleasant to the grain trade of Duluth.

Wheat receipts at the head of Lake Superior are very small, amounting last week to only 13,000 bu. The flour mills are almost idle, and are taking but little grain and shipping but little flour. Wheat freights are weaker, at 1¾ cents to Buffalo and 4½ cents to Montreal; oats 1¼ to Buffalo and under 4 cents to Montreal, Georgian Bay points same as Buffalo. There is little moving and no signs of very much business. Some new crop Duluth wheat has been sold for export, but this will not go forward until September. It is the first new crop to be placed abroad. The fear of a controversy between Minnesota and Wisconsin grain inspection and weighing officials, has been averted by a settlement under which the Wisconsin inspection will have charge of the coarse grain shipped to Superior, and of such wheat as shippers wish to have given that inspection, but Minnesota inspectors are to be permitted to carry on business in Wisconsin as now; though the new law calls this a misdemeanor. All grain weighing in Superior is to be by Wisconsin officials, and the receipts from that source will aid in maintaining the new system.

A lot of wheat stored at Duluth-Superior will never see the east, for Minneapolis is buying it for shipment back there and grinding into flour. Sales of at least 125,000 bu. have been made this week for such account, and there are evidences that much more will go there.

The steamer Soo City, owned by the Lake Michigan Transportation Co., is being fitted out at Ferrysburg to go on the South Haven-Chicago run as soon as the Chicago strike is over.



## LIVERPOOL SHIPPING LETTER

Liverpool, May 1.—What an unprofitable year 1904 has been in the North Atlantic trade is still further emphasized by the report just issued of the Leyland Line, one of the companies controlled by the International Mercantile Marine Co. Readers of the Marine Review will be aware that the German lines together with the Cunard Co., have each sustained great losses from the low freights and scarcity of cargo, not to mention the rate war which lasted for more than half the year. Now the Leyland management complain that during the first ten months of 1904 the freight rates were in a most depressed condition, even worse than during the previous year, and only the resumption of cattle shipments and the exercise of the strictest economy enabled the several services to be run without very serious losses. There was some improvement during the last two months of the year, and this improvement continues, making the present outlook better than a year ago. The gross profit earned is \$463,920, but the general expenses and fixed charges being \$529,075, there is thus a debit to profit and loss account of \$65,150. Depreciation to be written off on the same basis as taken in each year since the formation of the present company requires \$628,325, and as the book value of steamers sold and lost during the year exceeded the amount realized by sale and insurance by \$201,575, the total amount required to cover depreciation and losses is therefore \$805,050. Against this there is the credit of profit and loss account brought forward, \$1,820, and balance of reserve fund, \$315,030, leaving \$568,380 to be provided out of future earnings. As compared with the thirteen months to Dec. 31, 1903, the period covered by the last balance sheet, the year's trading, however, shows an improvement of \$347,305. No dividend is declared on the preference shares for the past year, and as only six months interest was paid in 1903, the arrears on these shares now amount to considerably more than the debit balance on profit and loss accounts. It may be interesting to add that for the year 1903, in order to provide for depreciation, debenture interest and 5 per cent dividend on the preference shares for six months, it was found necessary to transfer \$1,302,500 from the reserve fund, leaving a balance in that fund of \$325,000, now wholly absorbed by the 1904 deficiency. When one reflects on the recent achievements of the company, it is impossible to avoid the conclusion that it will require a great deal to restore its fortunes to their former level. The profits of the company in the year 1900 were as much as \$2,219,630, and it was on the strength of that quite exceptional figure that Mr. Pierpont Morgan acquired the undertaking. In the following year the profits fell to \$730,305, and in 1902 they disappeared altogether.

The war of rates between the German Shipping Co., Hansa of Bremen and certain British companies trading to the east has assumed larger dimensions for it has extended to the British lines running from London, Liverpool, Middlesborough and Hull to Indian ports. The Hansa Line began the dispute on March 31 by addressing a circular to their customers in which it was indicated that it was intended to obtain for that line a monopoly of all the trade between Antwerp and Indian ports. This move directly affected the British Indian Steam Navigation Co. and the Peninsular and Oriental Co., both of which had formerly worked in harmony with the Hansa. Both British companies replied by reducing their freight rate from Antwerp to Indian ports from \$4.25 to \$1.50 per ton. The Hansa retaliated by entering into competition with the British companies in the trade with British ports. The result of this has already been to reduce the rates from British ports to Calcutta by 75 per cent. A long and bitter fight between them is expected to follow. The two British companies engaged in the struggle possess 182 large steamers with an aggregate tonnage of 810,000 tons, while the Hansa have only fifty steamers with a tonnage of 200,000 tons. The Hansa company is there-

fore faced by a combination far more formidable than its own organization. The Hansa company defend their attitude by asserting that the rate dispute was begun by the British lines. They say that the P. & O. and the British India companies on Jan. 31 last, gave two months notice terminating the agreement with the Hansa line which had lasted twelve years. Directly after the termination of the agreement the British companies berthed a large number of sailings against the Hansa company's lines from Antwerp. This was the commencement of the struggle. The action taken by the Hansa company since had been taken in self defense for the purpose of protecting the trade they had built up during the last fifteen years.

The White Star liner *Germania* has just made her debut in a new role, having sailed from the Mersey on Friday for Canada with a full list of cabin and third class passengers. As a Liverpool and New York liner in her palmy days the *Germania* boasted with the best of her compeers of her saloon accommodation for which wealthy patrons of Atlantic travel were content to pay as much as \$200 or \$250 a head. The saloon accommodation is still there, but it is no longer designated as such, or charged for as such. The *Ottawa*, as the *Germania* is now called, carries only two classes of passengers. Those who pay cabin fare, some \$45 or \$50, get the old saloon accommodation of the state cabin description, for which four or five times that sum used to be paid upon the New York route. Under such circumstances the Dominion liner *Ottawa* should prove in her present sphere of activity an even more popular boat than she was when she sailed beneath the White Star flag. For the trifle of a few dollars it is possible for the voyager of today to play the part of a millionaire upon the ocean for the space of seven or eight days, and to make his long trip east or west amid practically first-class hotel surroundings.

I have gleaned the following particulars relating to the huge vessel "*Amerika*," launched a week ago by Messrs. Harland & Wolff, of Belfast, for the Hamburg-American Line. The new vessel is 670 ft. long, 74 ft. wide, and 52 ft. 7 in. deep, with a net registered tonnage of 16,000 tons, and gross register of 22,500 tons, the total weight of the ship being about 41,000 tons. She has been built to accommodate 600 first-class, 300 second-class and 2,300 steerage passengers, and with her complement of 550 officers and men, accommodation is provided altogether for 4,050 persons. The "*Amerika*," it should be noted is both shorter and narrower than the *Baltic* but is deeper by 3 ft. 7 in. She will thus be the deepest ship in existence until she is displaced by the still longer, broader and deeper vessel building for the same owners at Stettin. The *Amerika* is actually the first German steamer of over 20,000 tons, for so far Germany has not possessed any vessel of that figure, though the *Kaiser Wilhelm II* falls short by only a very few tons. It is, however, very evident that the change which is taking place in Britain also extends to Germany, for it is worthy of note that as regards most recent ocean steamers they exceed those built before them in size but not in speed. Of the new features which have been introduced perhaps the most novel are the electric elevators, similar to those in use in first-class hotels. Another is a magnificently fitted up restaurant, in which passengers may dine *a la carte* when they so choose, and arrange luncheon and dinner parties on board. There are eight decks, and of the three upper decks, one will be reserved exclusively for promenades, while the other two will be set apart for deck chairs and lounges. The height of the vessel from keel to boat deck is 77 ft. 6 in. Her engines are of the four cylinder quadruple-expansion type. They are capable of developing about 17,000 I. H. P., and give a speed of between 19 and 20 knots. The vessel is intended for the Hamburg and New York passenger and cargo trade.

Regarding the almost unanimous colonial opposition to the contract for the West Indian mails being given to the Elder Dempster Line, it is currently reported at the time of writing

that the British government still declines to submit the offers of the Royal Mail Steam Packet Co. to the colonies, and as a further indication of this attitude, the governor of Trinidad, it is stated, has been instructed to peremptorily deal with the contract and say definitely whether the colony will accept Messrs. Elder Dempster's offer or have no contract at all. I hear that Messrs. Elder Dempster & Co. have decided that in the event of their tender being confirmed by parliament, Plymouth will be utilized as a port of call for the embarkation of mails and passengers. At present the West Indian outward mails are embarked at Southampton, and the homeward are landed at Plymouth. It is not expected that the colonial sympathy with the Royal Mail Co. will be of much avail with the home government.

The new submarine of the "B" class now being completed for sea represents the latest work of the British Admiralty for that class of craft. They show, also, a marked development on the original type of submarine introduced into the British navy some three or four years ago, and embody features and qualities that constitute in many ways a new departure. A comparison with the main points of the existing vessels of the "A" class will show this at a glance. The original boats Nos. 1 to 5, were of 120 tons displacement, 150 H. P. and  $7\frac{1}{2}$  knots surface speed. Then came the "A" class of from 180 to 200 tons with a surface speed of 15 knots and 9 knots under water, and a radius of action of 300 miles. The new "B" class boats now building are of 300 tons displacement with 850 H. P. and carry engines designed to give a speed of from 14 to 16 knots on the surface and from 9 to 10 knots below water, with a radius of action of 500 miles. The motive power in the older boats of both classes was derived from gasoline engines when on the surface and when below water from electric motors. In the "B" class, the motive power is entirely electricity, supplied from accumulators. The diving arrangements in the "B" class show, also, a great advance on the old system under which it took a boat three minutes to dive. The older boats, also, in order to remain under water had to keep in motion. The older boats cost \$250,000 each; the "B" class upwards of \$650,000 each. There are at the present moment in the service 13 boats of the "A" class, exclusive of the five older boats of the original Holland pattern, and eleven new "B" class submarines, one of which is ready and the others are now building at Barrow. All the British boats, it should be said, are of the type known as submersible—large vessels capable of acting away from a home base, possessing special methods of propulsion and having a large reserve of buoyancy when afloat.

The Erie's new ferryboat Goshen now wears the "new broom" nailed to her pilot house in token of having won the title of "the fastest ferryboat in New York harbor." This was accomplished in a recent trial of six hours, between the Whitehall ferry landing in New York City and St. George on Staten island. It was a test over a measured course for the benefit of the city officials who are to manage the Staten Island ferry in future. On some of her trips the Goshen covered the distance in twenty minutes, which is eight minutes less than the regular time schedule. Her average for the eight trips made was 22 minutes, 40 seconds, which is better by more than five minutes than the time table calls for. The boat is not only the fastest, but one of the handsomest in the harbor and cost close to \$250,000. The Goshen is one of the type of ferryboats to be exclusively used by the Erie in the near future.

Mr. Charles W. Morse, of New York, who purchased the Metropolitan Steamship Co. last week, announces that he intends to build four turbine passenger steamers for service between New York and Boston.

### THE FUTURE LIVERPOOL OF JAPAN

Editor Marine Review:—"The Future Liverpool of Japan" is the title of a very interesting article in the March issue of the Anglo-Japanese Gazette, of London, England. From it the following is extracted: Japan has thirty ports open to foreign trade, the principal ones being Kobe, Moji, Yokohama, and Nagasaki. During 1902, the vessel entrances and clearances at these four ports in tonnages and number of vessels, were:

Entered and cleared:

	Vessels.		Total vessels.
	Japanese.	Foreign.	
Kobe .....	11,653	784	12,437
Moji .....	15,172	790	15,971
Yokohama .....	2,156	505	2,721
Nagasaki .....	2,241	687	2,928
Total vessels ...	31,222	2,835	34,057
	Tonnage.		Total tonnage.
	Japanese.	Foreign.	
Kobe .....	7,147,892	4,442,540	11,590,432
Moji .....	7,112,140	2,514,639	9,626,779
Yokohama .....	3,308,779	2,460,958	5,775,737
Nagasaki .....	2,040,934	2,608,478	4,709,412
Total tonnage..	19,609,745	12,092,615	31,702,360

Summary, four ports only, for one year only:

Vessels, entered and cleared .....	34,057
Tonnage, entered and cleared.....	31,702,360

Are not these figures for only four ports of "Little Japan" somewhat startling to occidental eyes? Osaka, the "Venice of Japan," is the second city in the empire, in point of size and commercial importance. Osaka is noted as the keenest trade center in the empire; its commercialism is conducted on the sharpest and most daring lines. Thousands of factories; day and night there is a ceaseless whir and throb of machinery. Before the railway to Kobe was opened, Osaka was even of more importance, commercially, than today—still, even now, two-thirds of Japan's trade is transacted in Osaka. Steps are now being taken to recover the lost commercial ground, and to make Osaka the "Future Liverpool of Japan," by the construction of a harbor capable of being used by the largest vessels afloat.

Osaka proper covers an area of eight square miles and has a population of 1,000,000. The foreign settlement is at Kawaguchi. Several railways converge at Osaka. One line runs to Sakai, where the famous cotton-rugs and carpets of Japan are manufactured. Practically Japan's entire trade with Corea, and more than half that with China, passes through the port of Osaka. For years its people have cherished the desire to see Osaka a shipping center of the first importance.

By persistent urging, and by the probable beginning of the construction of the American Panama Canal, the Japanese government saw the point and made a start eight years ago, with an appropriation of \$11,250,000 (22,500,000 yen). The work has made much progress, and the actual expenditure to Dec. 31, last, was \$9,054,000. Of this the sale of reclaimed lands produced \$4,000,000, and of other properties, \$400,000. If the whole scheme is carried out (and doubtless will be, as the Japanese are thorough in all they undertake) and Osaka be made a national harbor, further reclaiming will cost \$7,000,000 (minus the value of the reclaimed land), for railway construction and warehouses, \$5,000,000, and for roads and canals, \$5,000,000 more.

Extensive workshops for ship machinery repairs have been erected on the reclaimed land. These shops are fitted with the most up-to-date machinery.

One of the breakwaters is 4.847 yards, and the other 3.022 yards long. The dyke is 1,630 yards long. The landing pier is 1,500 ft long, and 540 ft. broad. Two docks will accommodate enough vessels to handle 3,000,000 tons of cargo a year.

On this showing the claim that Osaka is the "Future Liverpool of Japan" is not far-fetched.

Schenectady, April 25.

WALTER J. BALLARD.

## TOUR OF THE OHIO RIVER

**The Committee on Rivers and Harbors of the House of Representatives is making it to investigate the necessity for its improvement.**

For the purpose of investigating conditions requiring the canalization of the Ohio river from Pittsburg to the Mississippi, urged upon congress by the entire Ohio Valley, and the advisability of recommending a 9-ft. channel from Lock No. 6, at Beaver, Pa., to Cairo, eleven members of the congressional rivers and harbors committee left Pittsburg early Wednesday morning, May 10, on an eight-day tour of inspection of the Ohio, on the steamer *Queen City*, of the Pittsburg & Cincinnati Packet Line, as guests of the Ohio Valley Improvement Association. Elaborate preparations have been made for the entertainment of the committee at all of the more important cities along the river and the tour of inspection will end at Cairo, Ill., on the evening of May 17.

Anticipating the arrival of the members of the committee at Pittsburg on Monday, May 8, a most complete program for a two-day entertainment was outlined. Unfortunately the majority of the committee did not reach Pittsburg until Tuesday morning, and the first day's outing was eliminated with the exception of the box party at the Nixon Theater on Monday night. Early Tuesday morning, the committee, accompanied by the Pittsburg city officials and the councilmanic committee, left the Hotel Schenley in automobiles, and after a ride through Schenley Park arrived at Brilliant on the Allegheny River, where they boarded the steamers *Loma* and *Luzon*.

The party then steamed up the Allegheny and inspected Dam No. 3 at Springdale, Dam No. 2, in course of construction, at Brilliant, and Dam No. 1 at Herrs Island. Dam No. 1 with its successful working of the bear traps was the cause of favorable expressions and comment. The trip was then continued down the Allegheny to the Monongahela, where the *Island Queen* was boarded and the trim excursion boat made her initial trip. The new boat was elaborately trimmed with bunting and flags and all the boats in the harbor gave a salute when she steamed gaily into port. There were over seventy steamers moored in the harbor and the din was deafening. Steaming up the river the party had an opportunity of seeing the greatest iron and steel mills and blast furnace plants in the entire Pittsburg district which are located on both sides of the river. Nearly the entire afternoon was spent in inspecting Lock and Dam No. 2, now under construction and which will replace old Dam No. 2 when completed. It was intended to go up as far as McKeesport, but owing to the lack of time this part of the trip was abandoned.

In the evening a banquet was tendered the committee by the citizens of Pittsburg, at the Hotel Schenley. Over 300 were in attendance. The menu cards were as beautiful as the menu was elaborate, consisting of a handsome booklet embossed in black and gold with the seal of the City of Pittsburg flanked by the stars and stripes.

Judge Joseph Buffington of the United States district court presided as toastmaster, flanked on the right by Mayor W. B. Hays, Hon. Theodore E. Burton, chairman of the rivers and harbors committee; Hon. James W. Brown, Hon. James F. Burke, Hon. B. B. Dovenor of the committee, S. M. Sparkman, Hon. E. F. Acheson, Hon. W. H. Graham, Hon. J. H. Davidson, James H. Willock, Hon. James McLachlan, R. F. Jones, Hon. J. Adam Bede, James McCrea, Hon. W. L. Jones, Captain J. A. Henderson, E. F. Hutchinson, Director Harry Moore, Rev. Daniel Dorchester and President R. B. Ward of Common Council and on the left by S. J. Wainwright, Jr., Hon. John Dalzell, Director E. M. Bigelow, Colonel John L. Vance, Robert Pitcairn, Hon. R. P. Bishop, Controller J. B. Larkin, Hon. Del. S. Alexander, John F. Steel, Hon. William

Lorimer, D. C. Ripley, Hon. J. E. Ransdell, J. M. Guffey, James H. Cassidy, H. P. Bope, J. G. McGannon, W. D. Porter, Hon. H. K. Porter and James W. Clark.

Judge Buffington was introduced by Samuel J. Wainwright, and after talking briefly read a telegram from Secretary of War Taft regretting his inability to attend. Congressman James W. Brown then delivered the following address of welcome:

"The total railroad tonnage handled in this district is equal to 2,500,000 cars of freight. I have my doubts if there are freight cars enough in this world to load such a tonnage at this time, and if they were loaded and placed in one continuous train they would stretch over three-fifths of the earth's circumference at the equator. It would require 9,000 ships of 10,000 tons burden each to hold the entire tonnage of this district.

"We do not presume to intimate that any such tonnage as this would be shipped over the Ohio river if it were improved even to a 9-ft. stage, but we do contend that it would increase very materially and that it will increase so fast under any circumstances that the aid of this river to move the enormous tonnage of this district will be a necessity. As it is now under the uncertain conditions which prevail in the navigation on this river there is to-day about 11,000,000 tons of freight shipped over it. Many months in the year navigation upon it is impossible, and thousands of tons of coal are stored in our harbors and at our coal mines awaiting shipment when nature shall furnish water enough to move the fleet.

"Ribbons of steel stretch from the Atlantic to the Pacific and over this continent, across mountains and plains, rivers and bays, made of Pittsburg steel rails. Gigantic buildings arise every year in every city in our country, erected with Pittsburg structural steel. The reflection of the sun is seen from the time it rises in the Atlantic until it sets in the Pacific on millions of windows made from Pittsburg glass. The product of our coal mines gives light and heat over this broad land, and we believe to-day that were there a regular system of navigation on the Ohio river that we could, by water transportation, reach the great Mississippi and the waters of the Gulf beyond, and that a business West and Southwest could and would be built up entirely independent of the railroad transportation, and we are satisfied that it will be a necessity, since the business of the district will outstrip the capacity of the railroads to handle it. We do not believe that there is a more important improvement to-day contemplated in this country than the one which you have to-day in contemplation."

This was responded to by Hon. Theodore E. Burton, as to whose address attention will be given in the next issue.

Speeches were also made by Congressman-elect Francis Burke and Congressman John Dalzell. On behalf of the Ohio Valley Improvement Association Col. J. L. Vance, of Columbus, spoke in part as follows:

"Some years ago Mr. Burton asked our association to aid in the education of the people to the end that more liberal appropriations for rivers and harbors might be made by his committee and meet the approval of the people of the country. His suggestion has been followed in the Ohio valley, and to-day the millions of people who are embraced within the borders of the states we shall visit on this trip, and the other millions who live in contiguous states, are united in demanding the most liberal appropriations for the improvement of the rivers and the harbors of our country, knowing as they do, that the solution of the question of transportation is the most important one devolving upon the lawmakers of our country."

The members of the Congressional committee that have undertaken the trip are as follows: Theodore E. Burton, chairman, Cleveland; B. B. Dovenor, Wheeling, W. Va.; Roswell P. Bishop, Ludington, Mich.; Ernest F. Acheson, Washington, Pa.; Dr. Alva Stanwood Alexander, Buffalo; James



Henry Davidson, Oshkosh, Wis.; James McLachlan, Pasadena, Cal.; Wesley L. Jones, North Yakima, Wash.; J. Adam Bede, Pine City, Minn.; Stephen M. Sparkman, Tampa, Fla.; Joseph Eugene Ransdell, Lake Providence, La., and James F. Cassidy, secretary of the committee. The United States Engineering corps is represented by Lieut. Col. E. H. Ruffner, Major William L. Sibert, Major G. A. Zinn and Capt. Burgess.

### AROUND THE GREAT LAKES

The Erie canal was officially opened last week.

The vessels of the Mutual Transit Co.'s fleet will stop while north bound at Detroit this season.

R. T. Gray of Detroit bought the steamer Portage from the Craig Ship Building Co. of Toledo last week.

The big dredge West Superior owned by the Lake Superior Dredging Co. will work at Erie for the present.

Contract for the construction of a big coal dock to be built by M. A. Hanna & Co. at Superior has been closed.

The Anchor Line opened the passenger season to Duluth last week with the sailing of the steamer India from Buffalo.

Wm. H. Follette, manager of the W. H. Follette canal line, is erecting a large warehouse at the foot of Dock street in Buffalo.

Contract to build 200 ft. of dock for a landing place for its vessels at Macatawa Park has been let by the Graham & Morton Line.

The Montreal & Lake Superior Navigation Co. has ordered a 3,000-ton steamer from the Caledon Ship Building Co., Dundee, Scotland.

The schooner W. W. Rounds was wrecked on Black River reef last week. She was owned by C. A. Chamberlain of Detroit and was valued at \$4,000.

The teamsters' strike at Chicago is affecting the package freight business by lake at that port, some of the lines curtailing their service in consequence.

The steamer Maggie Duncan and the schooner O. O. Carpenter, recently sold by H. E. Runnels of Port Huron, to Boston parties, are to go to the coast.

The steamer Cumberland which went on the rocks off Bois Blanc islands by the parting of her wheel chains, was released by the tug Home Rule without lightering.

The steamer Joseph Gilchrist broke all the buckets off her wheel in backing away from the ore dock at Duluth last week. She is being towed down by the steamer D. M. Whitney.

The schooner George W. Roby which was in collision with the steamer Mariposa is in bad shape and has been put in dry dock at Cleveland. She will be in dry dock about three weeks.

The Canadian government has decided not to allow ships to load at night at the grain elevators on the ground that it cannot be done properly. Nor will Sunday work be permitted.

Mr. Harris W. Baker, wrecking master at Detroit, was the lowest bidder for removing the wreck of the barge Martini in the American channel above the head of Belle Isle bridge.

The steamer City of London rammed the schooner Houghton in the river at Lorain last week. The bow sprit of the Houghton was carried away, the bow stove in and the rigging damaged.

The schooner R. P. Mason loaded with 60,000 ft. of hard wood lumber from Gladstone, which went ashore five miles north of Cedar river, has been towed to Marinette with a broken back.

The schooner City of Toledo was towed into Toledo last week leaking badly and with the crew worn out by working forty-eight hours at the pumps and keeping the vessel afloat. The leak was caused by ice in Lake Huron.

E. J. Dolan, secretary and treasurer of the Dredgemen and Cranesmen's Union, conferred with dredge owners at Detroit,

Amherstburg and Toledo concerning some minor differences between them. The matters were readily adjusted.

Hugh McMillan, F. E. Drake of Detroit, and W. E. Bixby of St. Louis have organized the National Steamship Co. to operate the new freighter, contract for which was recently let by the American Ship Building Co. for 1906 delivery.

The initial cargo of the steamer James C. Wallace was 9,592 tons of ore which was delivered at Cleveland, being the largest cargo ever taken to that port. The Wallace did not load deeply and will probably carry 10,000 tons on her next trip.

Mr. A. R. Lee, manager of the Star-Cole Transportation Co., announced that the steamers Darius Cole and Idlewild will go in commission in the Buffalo-Crystal Beach route May 30, and the Arundel on the St. Lawrence river and Thousand Island route June 1.

Work upon the Pittsburg Steamship Co.'s steamer George W. Perkins at the West Superior yard has naturally been delayed by the excessive demand upon the yard for repairs to vessels, but the big ship is nevertheless progressing favorably and will be launched about the middle of June.

The barge J. M. Hutchinson received a severe shaking up when coming across Lake Huron last week. In the severe gale that was raging she broke away from the steamer and drifted about for more than four hours before the steamer picked her up with one anchor gone and her hold partly filled with water.

The freight steamer James P. Walsh, building at the Craig Ship Building Co.'s yard at Toledo, for Mr. C. O. Jenkins of Cleveland, will be launched at three o'clock on Tuesday afternoon next. Miss Florence M. Jenkins, sister of Mr. Jenkins, will christen the new steamer. The steamer will be commanded by Capt. A. J. Greenley.

The steamer Alice Stafford, recently purchased at marshal sale at the closing out of the Barry-Muskegon Line by J. O. Nessen of Manistee, will be operated between Milwaukee and Manistee in opposition to the Pere Marquette line of steamers. The new line will begin business as soon as the Alice Stafford comes out of dry dock.

Mr. F. W. Wheeler, formerly of Bay City, has sold the combination passenger and freight steamers Watson and Buckman to Seattle parties and they will be taken to the Pacific coast to trade between Seattle and San Francisco. Both of these vessels were built by the Craig Ship Building Co. of Toledo and have been employed in coast trade for some time.

Mr. John Marron who has been agent at Cleveland for a number of years for the Anchor Line, has been appointed agent for the Mutual Transit Co. He will handle the business of both lines. Mr. Hobart S. Hart has been appointed assistant agent. The Mutual Transit Co. and the Erie & Western Transportation Co. have provided a joint agency, dock, warehouse and other lake terminal facilities at Cleveland.

The steamer J. E. Mills sunk last Thursday night in Lake Erie off Middle Sister island. The Mills left Sandusky Thursday afternoon with a cargo of coal. Early in the evening she sprang a leak and made water so fast that the pumps had no effect. At nine o'clock she sank in 30 ft. of water. Capt. Lanaway and his crew of five men lashed themselves by the wrists to the masts of the steamer. All night long they clung there suffering intensely until Friday morning when rescued by the steamer Urania. The Mills was built in 1883.

The new Western liner Superior will be launched at the plant of the Great Lakes Engineering Works May 27. The keel for the Wm. G. Mather, which is to be the heaviest freighter on the lakes, was laid on the berth vacated by the launch of the Hoover & Mason. The Peter White is well in frames on the berth from which the James E. Davidson was launched. The new steamer Geo. H. Russel, launched April 25, at St. Clair, will be ready to go into commission for the Gilchrist fleet about the middle of June. Boiler and engine work has held the boat back.

## BRITISH ADMIRALTY CHARTS

Following is the bi-monthly list of publications of the Hydrographic department, British admiralty, handled by J. D. Potter, admiralty chart agent, 145 Minores, London:

- No. 2076. Scotland, north coast:—Loch Eriboll.
- No. 3466. Germany, Jade river:—Wilhelmshaven.
- No. 180. Sicily:—Taormina road.
- No. 3473. West Indies, Cuba, south coast:—Santa Cruz del Sur and approaches.
- No. 146. Africa, west coast:—Niger river (Nun entrance).
- No. 3478. Africa, west coast, Niger river mouth:—Brass river.
- No. 3476. Bay of Bengal:—Naaf river.
- No. 3475. Philippine islands, Luzon, southeast coast:—Matnog bay and Tiklin strait. Port Gubat.
- No. 1764. China, east coast:—Amoy, inner harbor.
- No. 994. Japan. Nipon, south coast:—Yeboshi bana to Anori zaki, including Gokasho ko and Hamashima ko. Hasama ura.
- No. 3472. Japan, inland sea:—Ujino ko.
- No. 2401. Sea of Marmara. Plan added:—Beikos Umur and Buyukdere bays.
- No. 2074. Mediterranean sea. Cyprus. New plan:—Kyrenia.
- No. 435. West Indies, Cuba. New plan:—Port Escondido.
- No. 2772. Eastern Archipelago. Anchorages in Gillolo. Plan added:—Loloda bay.
- No. 1394. China seas. New plan:—Entrance to Kuantan river.
- No. 2467. New Guinea. Plans and anchorages on the north coast. New plans:—Jamna road. Anus anchorage.
- No. 1510. Pacific ocean. Sandwich islands. Plan added:—Hanapepe bay.

## ADDITIONS.

- No. —. Index charts. A to V (omitting R).
- No. 1686. England, west coast:—Padstow bay.
- No. 2704. Ireland, west coast:—Blacksod bay.
- No. 1773. Ireland:—Queenstown and port of Cork.
- No. 2251. Baltic sea. Sheet II:—Kalmar sound, &c.
- No. 2728. Spain, north coast:—Bidassoa river to cape Peñas to Pontevedra bay.
- No. 689. Spain:—Gibraltar harbor.
- No. 369. Cape Verde islands.
- No. 565. Iceland, western portion.
- No. 321. North America. Lake Superior.
- No. 1148. West Indies. Leeward islands:—Ponce harbor.
- No. 2463. Alaska:—Port McArthur to Windham bay.
- No. 2462. Alaska:—Windham bay to Icy cape.
- No. 2461. Madagascar:—Nosi Vao to Purdy sand.
- No. 2871. Madagascar:—Nosi Be, southern anchorages.
- No. 492. India, west coast:—Aguada to St. George islands.
- No. 821. Bay of Bengal:—Elephant point to Cheduba strait.
- No. 823. Bay of Bengal:—Koronge island to White point.
- No. 824. Bay of Bengal:—White point to Mergui.
- No. 933. Eastern archipelago:—Batavia roads.
- No. 2578. Philippine:—Eastern part of the Sulu sea.
- No. 1262. China, south coast:—Hongkong to gulf of Liautung.
- No. 1199. China, east coast:—Kue shan islands to the Yang tse Kiang.
- No. 1602. China, east coast:—Approaches to the Yang tse Kiang.
- No. 1236. China, north coast:—Approaches to Port Arthur, etc.
- No. 2412. Japan:—Amoy to Nagasaki.

## TRADE NOTES

The National Electric Co. of Milwaukee has just issued two cards advertising the Christensen air brake equipments and the Lundell Universal motors and National generators.

Merchant & Evans Co., 517 Arch street, Philadelphia, has announced that it has purchased from Merchant & Co., Incorporated, all its property and assets and assumed all its debts and liabilities. Mr. Powell Evans continues as president.

The General Specialty Co., 101-107 Seneca street, New York, have just put on the market the Demon water-tube cleaner. It is intended to clean the scale from the tubes and the com-

pany has put out a circular setting forth how the cleaner works.

The Goldschmidt Thermit Co., 43 Exchange place, New York, have just issued a little pamphlet entitled Thermit Steel for Welding. Some extraordinary repairs have been made by the use of Thermit in welding and the pamphlet contains information of great value concerning the material.

The Dearborn Drug & Chemical Works have removed their New York office from 120 Liberty street to the new Barclay building, 229 Broadway, New York, where their facilities are greatly increased. The new offices are on the top floor, affording splendid light and a fine view of all New York.

The Greacen-Derby Engineering Co., Perth Amboy, N. J., have issued a little pamphlet dealing with expense due to the neglect of boilers. The secret of success in steam boilers is clear water. The circular represents that the Blackburn Smith patent filter embodies the experience of years in manufacturing and is the most economical thing that can be applied to keep a boiler in good order.

The Warren Steam Pump Co., Warren, Mass., has just put out a beautiful catalogue concerning their steam and power pumping machinery. It is the second issued to the public by this company. The company guarantees every pump built by it and if by reason of any defect with design or manufacture it should fail to do the service warranted, the defect will be made good at once or the price of the machine refunded. Anyone desiring a comprehensive literature concerning pumps would do well to write for the catalogue.

The Stanley Electric Manufacturing Co. and the General Incandescent Arc Light Co., have consolidated. The corporate title of the combined interest will be Stanley-G. I. Electric Manufacturing Co. The Stanley company as engineers and manufacturers of the well-known S. K. C. system, have acquired the reputation of turning out only such machinery as is markedly superior in points of engineering and manufacture over ordinary electrical apparatus. The officers are as follows: Wm. Murray Crane, president; C. C. Chesney, first vice president; M. D. Barr, second vice president; M. J. Insull, third vice president.

Mr. A. P. Head, the London representative of the Wellman-Seaver-Morgan Co., has just completed a tour around the world, and has established the following sub-agencies for the Wellman-Seaver-Morgan Co.: Melbourne—Australian Metal Co. as Australian agents. The branches of this concern are as follows:

New Zealand—The Gilbert Machinery Co., Wellington; Queensland—James Stothert, Brisbane; North Queensland—James Croker, Mackay; New South Wales—W. R. Laidley, Sydney; South Australia—James C. Fraser, Adelaide; West Australia—A. E. Thomas, Koolgardie; Tasmania—Lindsay Tullock, Launceston. In India the following agents representing the presidencies of Bombay, Bengal and Madras, have been appointed: J. Harper, Calcutta; Frank Harrison, Bombay; W. H. Oakes, Madras.

The Risdon Iron Works Co., San Francisco, Cal., will overhaul the government transport Thomas at a cost of \$50,000.

## McMyler Derrick Wanted.

McMyler Derrick to handle five tons on 45 ft. boom. State condition, delivery and price. E. M. Graves, Indianapolis, Ind.

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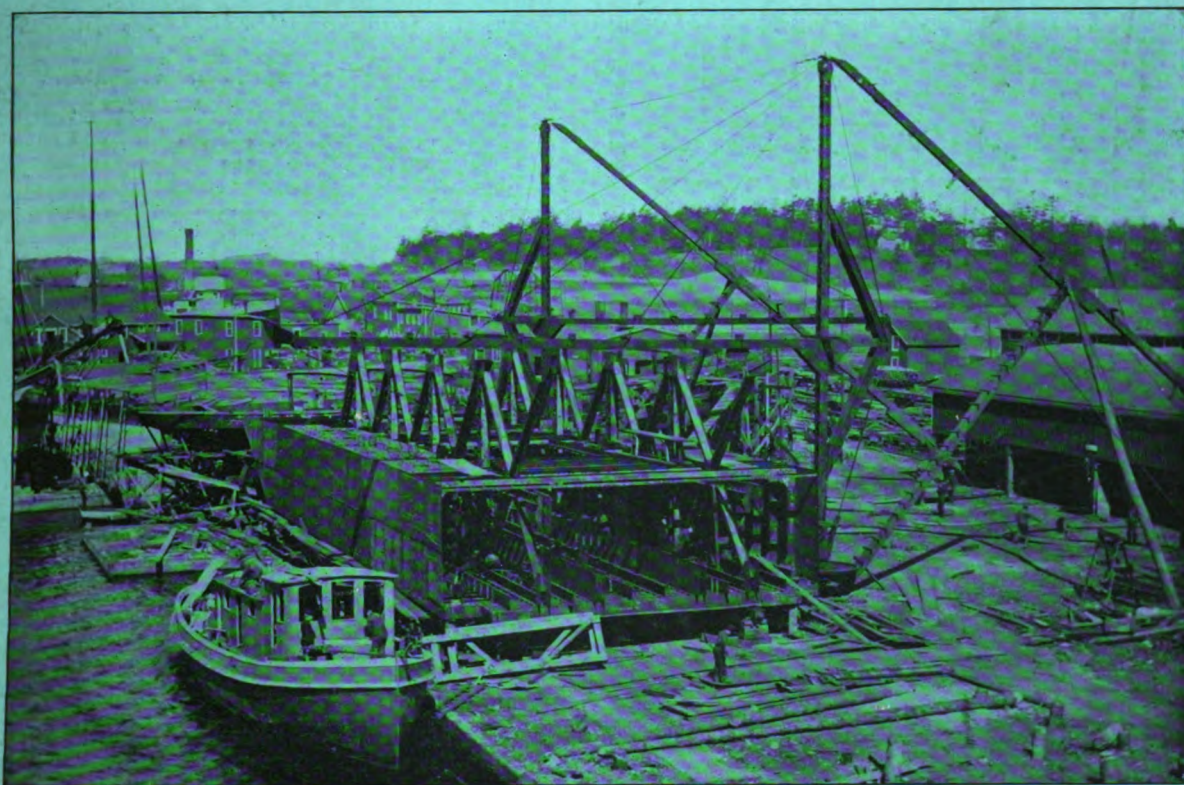
VOL. XXXI.

CLEVELAND, O., MAY 11, 1905.

No. 19.

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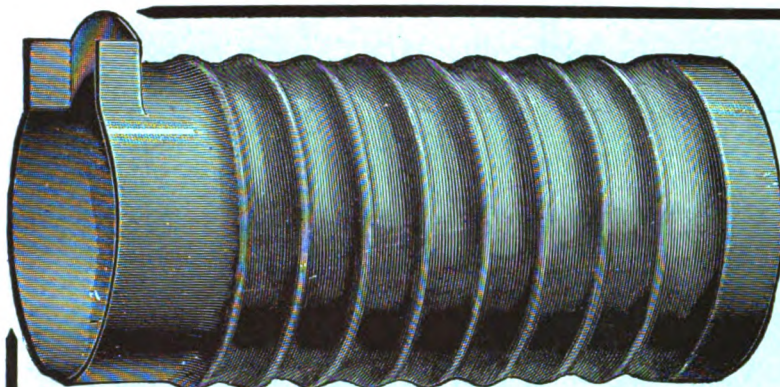
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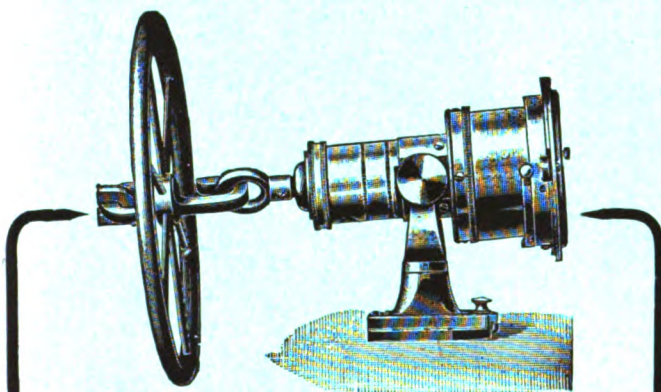
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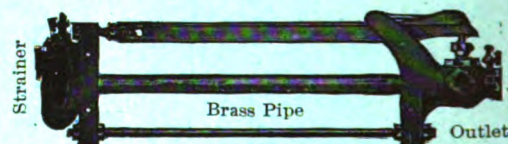
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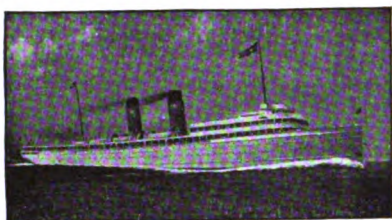
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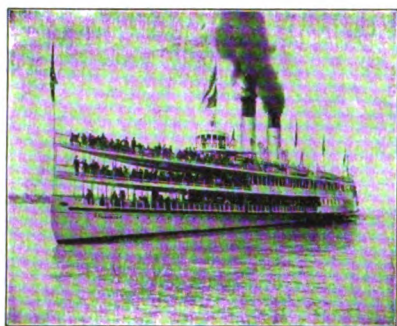
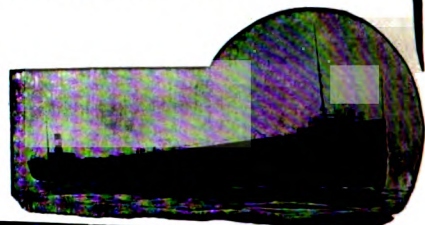
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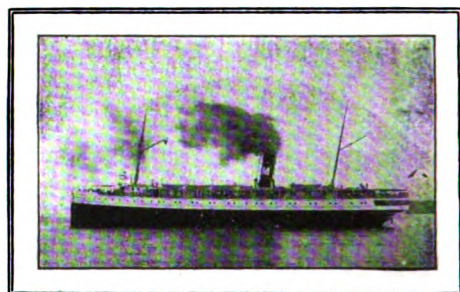
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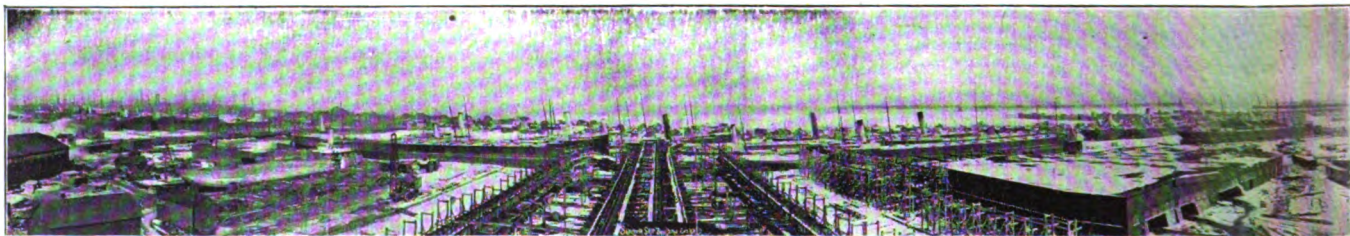


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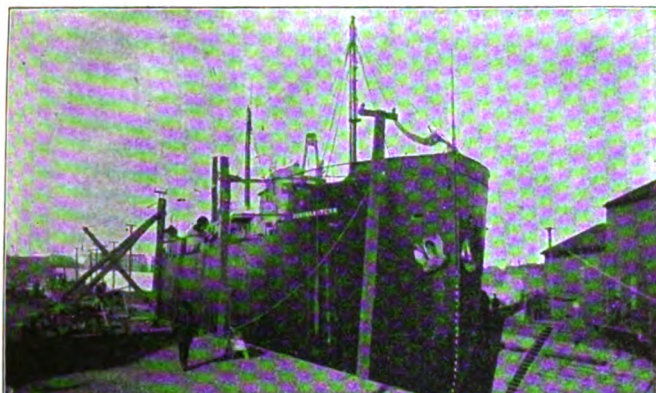
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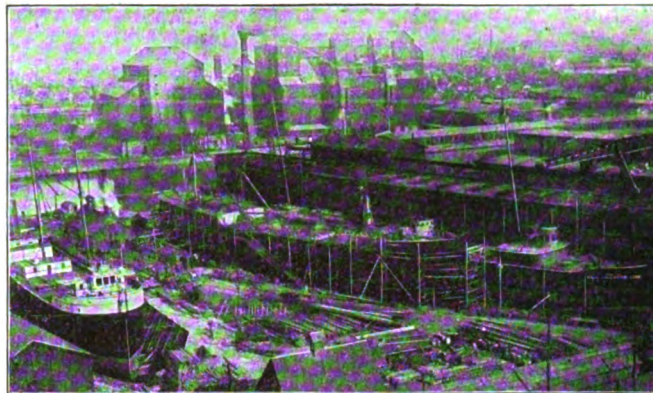
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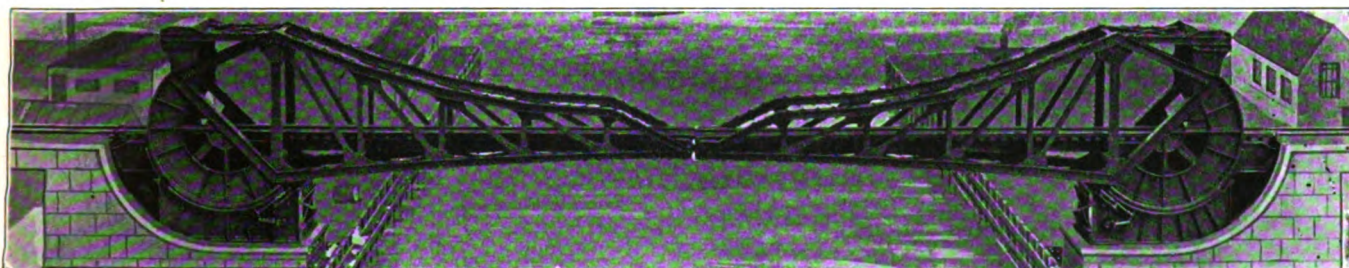
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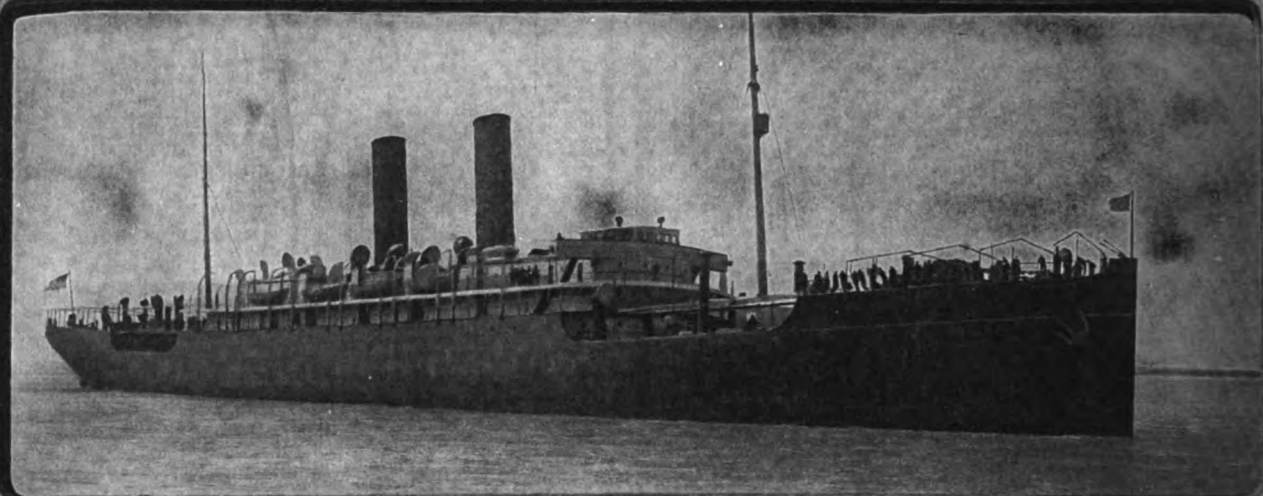
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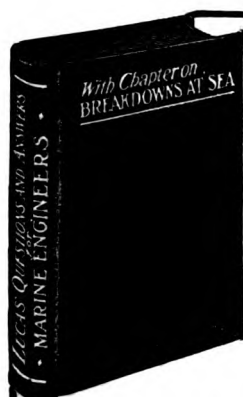
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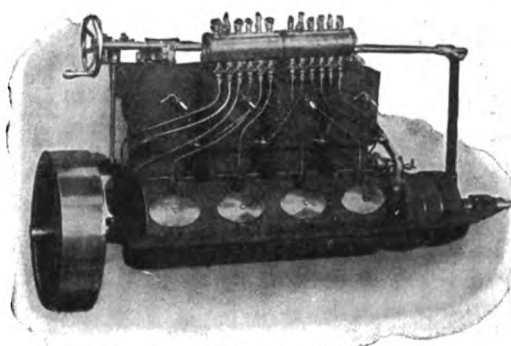
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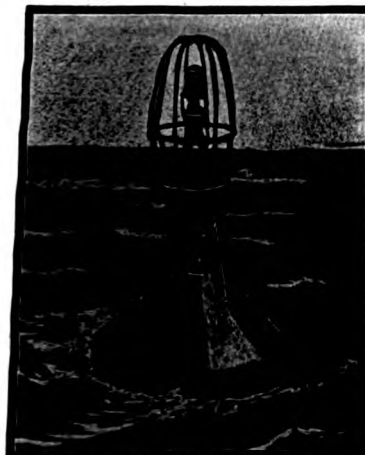
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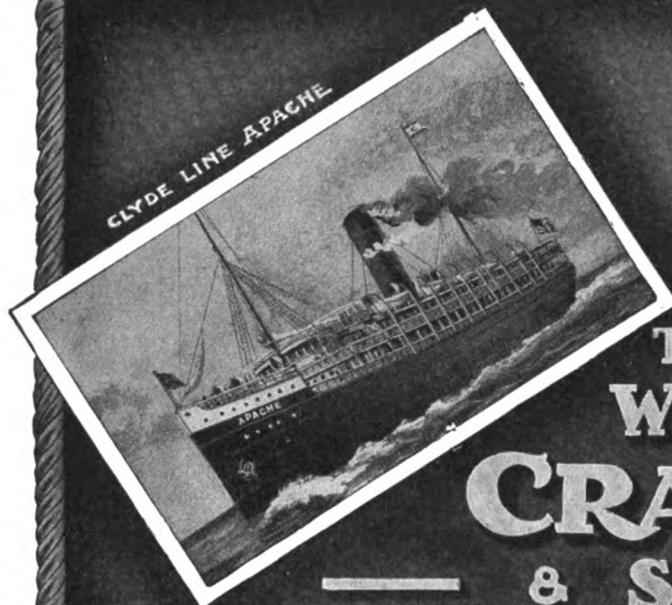
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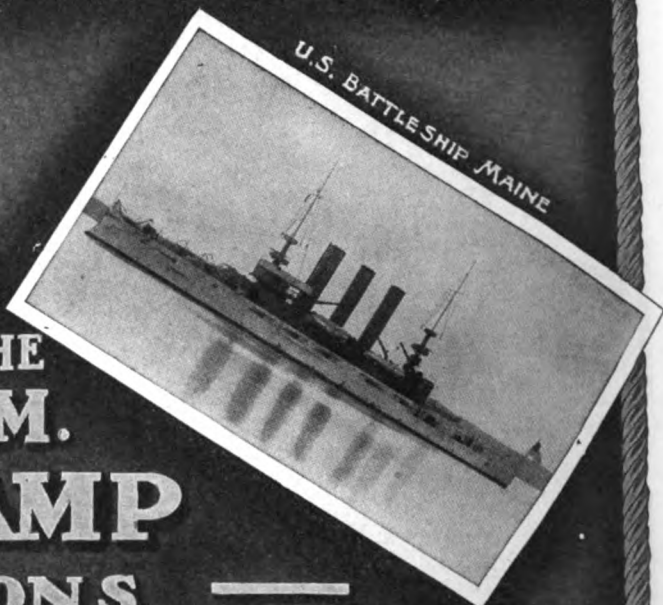
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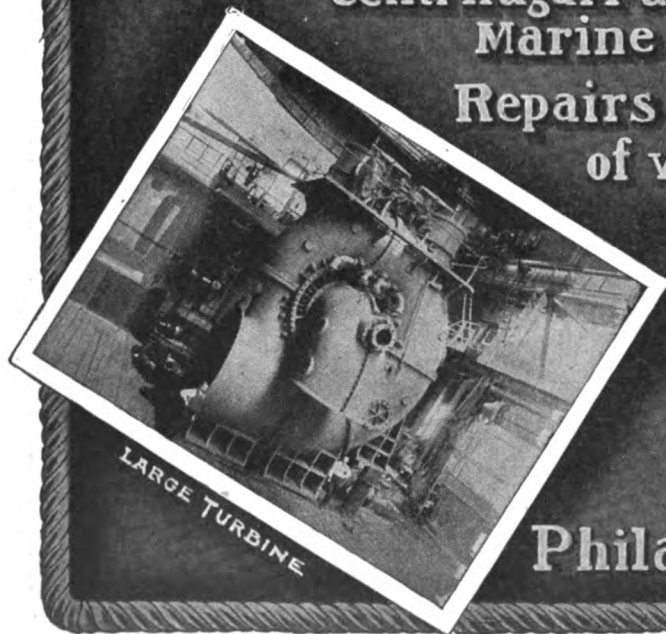
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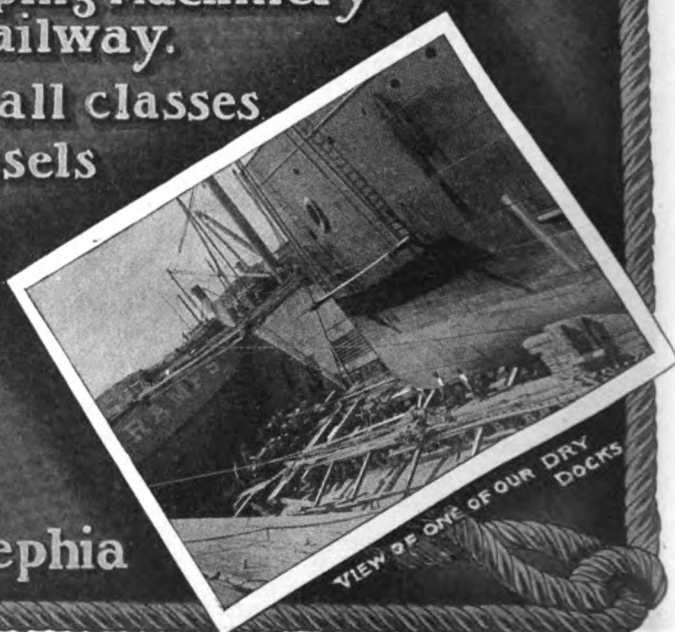
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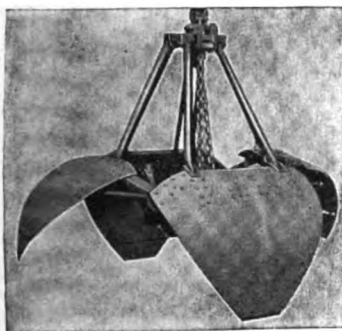
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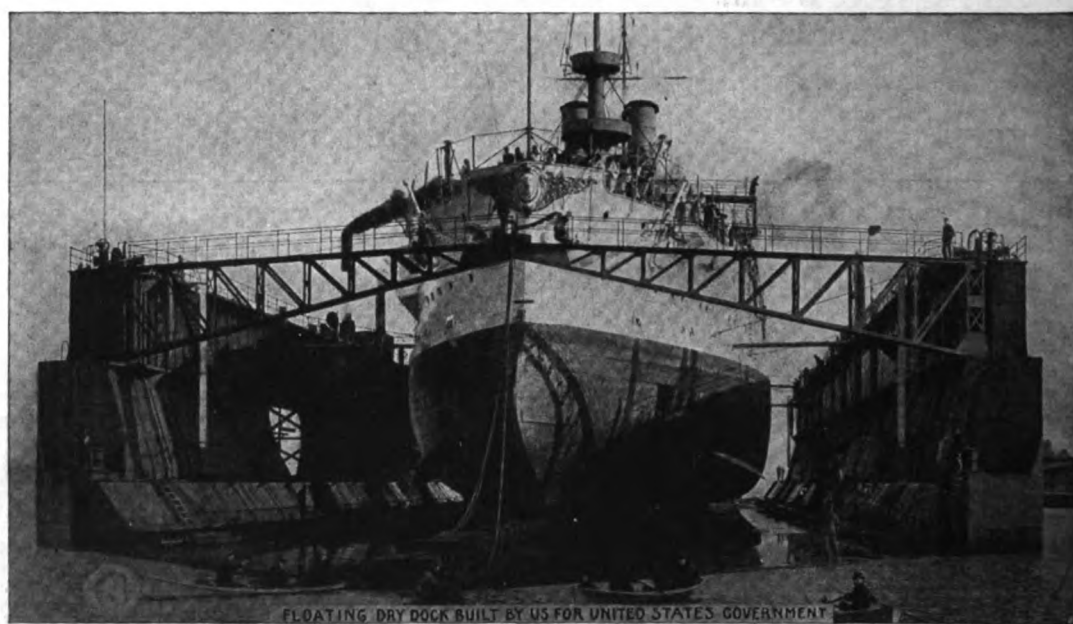
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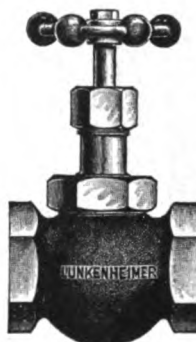
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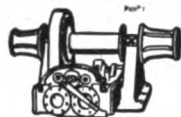
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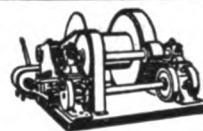
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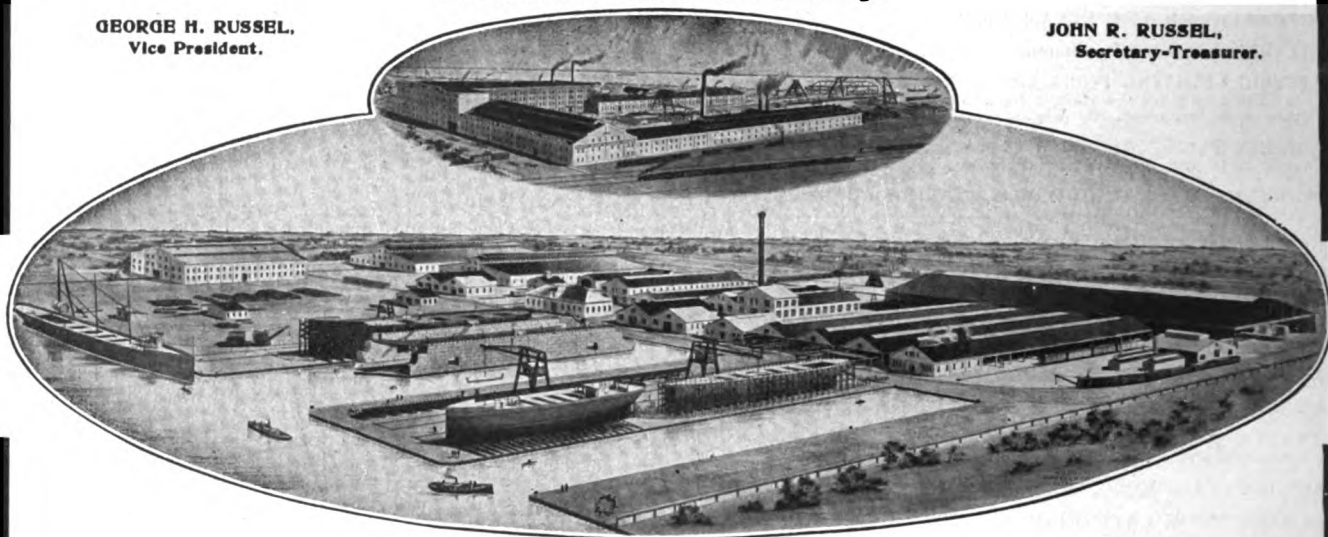
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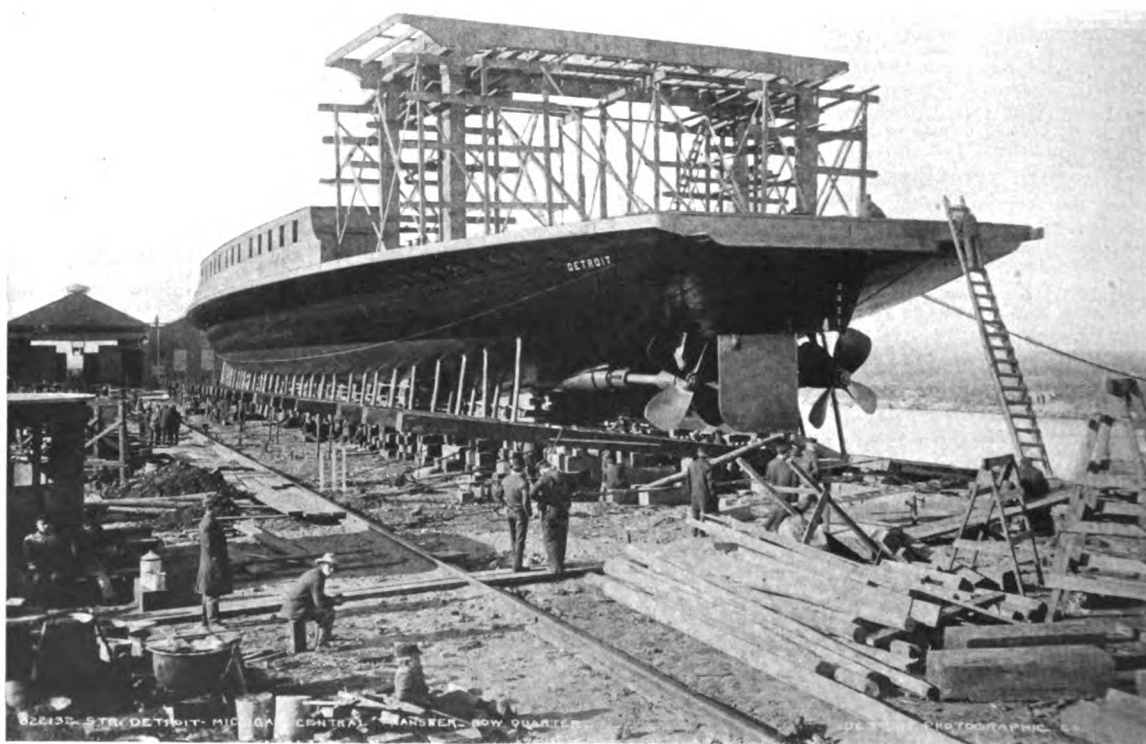
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## BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

## BOILER MANUFACTURERS.

Almy Water Tube Boiler Co., Providence, R. I.  
American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Babcock & Wilcox Co.....New York.  
Bertram Engine Works Co., Ltd.....  
.....Toronto, Can.  
Chicago Ship Building Co.....Chicago.  
Cramp, Wm. & Sons.....Philadelphia.  
Dearing Water Tube Boiler Co.....Detroit.  
Delaunay, Belleville & Co., St. Denis, France.  
Detroit Ship Building Co.....Detroit.  
Fletcher, W. A. & Co.....Hoboken, N. J.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Georgian Bay Engineering Works.....  
.....Midland, Ont.  
Great Lakes Engineering Works.....Detroit.  
Kingsford Foundry & Machine Works.....  
.....Oswego, N. Y.  
Marine Iron Works.....Chicago.

## BOILER MANUFACTURERS—Continued.

Maryland Steel Co.....Sparrows Point, Md.  
Milwaukee Dry Dock Co.....Milwaukee.  
Musher Water Tube Boiler Co.....New York.  
Newport News Ship Building Co.....  
.....Newport News, Va.  
New York Shipbuilding Co., Camden, N. J.  
Northwestern Steam Boiler & Mfg. Co.....  
.....Duluth, Minn.  
Roberts Safety Water Tube Boiler Co.....  
.....New York.  
Stirling, The Co.....New York.  
Superior Ship Building Co.....Superior, Wis.  
Taylor Water Tube Boiler Co.....Detroit.  
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

## BOILER RIVETS.

Bourne-Fuller Co.....Cleveland.

## BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co., Cuyahoga Falls, O.

## BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.  
Fore River Ship & Engine Co., Quincy, Mass.  
Great Lakes Engineering Works.....Detroit.  
Lunkenheimer Co.....Cincinnati.  
Macbeth Iron Co.....Cleveland.

## BRIDGES, BUILDERS OF.

Cowing, John P.....Cleveland.  
Scherzer Rolling Lift Bridge Co.....Chicago.

## BUCKETS, ORE AND COAL.

Brown Hoisting & Conveying Machine Co.....  
.....Cleveland.  
McMyler Mfg. Co.....Cleveland.  
Mayo & Bailey .....Chicago.

## BULKHEAD DOORS, WATERTIGHT.

"Long Arm" System Co.....Cleveland.

## CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

## CANVAS SPECIALTIES.

Baker & Co., H. H.....Buffalo.  
Bunker, E. A.....New York.  
Upson-Walton Co.....Cleveland.

## CAPSTANS.

American Ship Windlass Co., Providence, R. I.  
Hyde Windlass Co.....Bath, Me.  
Marine Mfg. & Supply Co.....New York.

## CARPETS, RUGS AND FURNITURE.

Williams & Rodgers Co.....Cleveland.

## CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co.....Jersey City, N. J.

## CHAINS.

Woodhouse Chain Works.....Trenton, N. J.

## CHAIN CONVEYORS, HOISTS.

Brown Hoisting Machinery Co. (Inc.).....  
.....Cleveland.  
General Electric Co.....Schenectady, N. Y.

## CHAIN HOISTS.

Boston & Lockport Block Co.....Boston, Mass.

## CHARTS.

Penton Publishing Co.....Cleveland.  
Potter, J. D.....London.

## CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co.....Boston.  
Ritchie, E. S. & Sons.....Brookline, Mass.

## COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland.  
Ironville Dock & Coal Co.....Toledo, O.  
Pickands, Mather & Co.....Cleveland.  
Pittsburg Coal Co.....Cleveland.

## COAL AND ORE HANDLING MA-CHINERY.

Brown Hoisting Machinery Co. (Inc.).....  
.....Cleveland.  
Link Belt Machinery Co.....Chicago.  
McMyler Mfg. Co.....Cleveland.

## COMPASSES.

Ritchie, E. S. & Sons.....Brookline, Mass.

## CONDENSERS.

Great Lakes Engineering Works.....Detroit.  
Thropp & Sons Co., John E., Trenton, N. J.

## CONTRACTORS FOR PUBLIC WORKS.

Breyman & Bros., G. H.....Toledo.  
Buffalo Dredging Co.....Buffalo.  
Chicago & Gt. Lakes Dredge & Dock Co.....  
.....Chicago.  
Dunbar & Sullivan Dredging Co.....Buffalo.  
Fitz-Simons & Connell Co.....Chicago.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Lake Superior Contracting & Dredging Co.,  
.....Duluth, Minn.  
Smith Co., L. P. & J. A.....Cleveland.  
Starke Dredge & Dock Co., C. H., Milwaukee.  
Sullivan, M.....Detroit.

## CORDAGE.

Baker & Co., H. H.....Buffalo.  
Upson-Walton Co.....Cleveland.

## CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg, Pa.  
Kahnweiler's Sons, D.....New York.

## CRANES, TRAVELING.

Brown Hoisting Machinery Co.....Cleveland.  
McMyler Mfg. Co.....Cleveland.

## DIVING APPARATUS.

Morse, A. J. & Son.....Boston.  
Schrader's Son, A.....New York.

## DREDGING CONTRACTORS.

Breyman & Bros., G. H.....Toledo.  
Buffalo Dredging Co.....Buffalo.  
Chicago & Gt. Lakes Dredge & Dock Co.....  
.....Chicago.  
Dunbar & Sullivan Dredging Co.....Buffalo.  
Fitz-Simons & Connell Co.....Chicago.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Lake Superior Contracting & Dredging Co.,  
.....Duluth, Minn.  
Smith Co., L. P. & J. A.....Cleveland.  
Starke Dredge & Dock Co., C. H., Milwaukee.  
Sullivan, M.....Detroit.

## DRYING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.

## DRY DOCKS.

American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Buffalo Dry Dock Co.....Buffalo.  
Chicago Ship Building Co.....Chicago.  
Craig Ship Building Co.....Toledo, O.  
Cramp, Wm. & Sons.....Philadelphia.  
Detroit Ship Building Co.....Detroit.  
Great Lakes Engineering Works.....Detroit.  
Lockwood Mfg. Co.....East Boston, Mass.  
Milwaukee Dry Dock Co.....Milwaukee.  
Newport News Ship Building Co.....  
.....Newport News, Va.  
Shipowners Dry Dock Co.....Chicago.  
Superior Ship Building Co.....Superior, Wis.

## ELECTRIC HOISTS AND CRANES.

General Electric Co.....Schenectady, N. Y.

## ELECTRIC LIGHT AND POWER PLANTS.

General Electric Co.....Schenectady, N. Y.  
Mietz, Aug.....New York.  
Sturtevant, B. F. & Co.....Hyde Park, Mass.  
Thropp & Sons, John E., Trenton, N. J.



**WANTED and FOR SALE Department.****PROPOSALS.**

**PROPOSALS FOR REPAIR OF JETTIES.**—U. S. Engineer Office, 262 Huron Street, Cleveland, Ohio, May 8, 1905. Sealed proposals for Stone Reinforcement and Repair of Jetties at the harbors of Port Clinton, and Vermilion, Ohio, will be received at this office until 2 P. M., June 8, 1905, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. **DAN C. KINGMAN**, Lieut. Col. Corps of Engineers, U. S. A. June 1

U. S. Engineer Office, Milwaukee, Wis., April 15, 1905.—Sealed proposals for dredging Gladstone Harbor, Mich., concrete superstructure on Breakwater and on North Harbor Pier, Milwaukee, Wis., and removing old piers and building pile piers and timber superstructure, Waukegan Harbor, Ill., will be received here until 3 P. M., standard time, May 16, 1905, and then publicly opened. Information furnished on application. **J. G. Warren**, Major Engrs. May 11

**PROPOSALS FOR RECONSTRUCTING PIER.**—U. S. Engineer Office, 262 Huron Street, Cleveland, O., April 17th, 1905. Sealed proposals for reconstructing and repairing parts of the West Pier at Lorain Harbor, Ohio, will be received at this office until 2 P. M., May 19th, 1905, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. **DAN C. KINGMAN**, Lieut. Col. Corps of Engineers, U. S. A. May 11

**PROPOSALS FOR DREDGING.**—U. S. Engineer Office, 262 Huron Street, Cleveland, O., April 19, 1905. Sealed proposals for improving Cleveland Harbor, Ohio, by dredging, will be received at this office until 2 P. M., May 22d, 1905, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. **DAN C. KINGMAN**, Lieut. Col. Corps of Engineers, U. S. A. May 18

**PROPOSALS FOR DREDGING.** U. S. Engineer Office, 262 Huron Street, Cleveland, Ohio, May 5, 1905. Sealed proposals for dredging in Sandusky Harbor, Ohio, will be received at this office until 2 P. M., Standard Time, June 5, 1905, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. **DAN C. KINGMAN**, Lieut. Col., Corps of Engineers, U. S. A. June 1

U. S. Engineer Office, Buffalo, N. Y., April 29, 1905.—Sealed proposals for construction of stone superstructure and sea slope, and for stone riprap, on South Harbor section of Buffalo breakwater, will be received here until 11 A. M., May 29, 1905, and then opened. Information furnished on application. **H. M. Adams**, Lieut. Col. Engrs. May 25

U. S. Engineer Office, Buffalo, N. Y., April 26, 1905. Sealed proposals for dredging in Buffalo River Entrance Channel will be received here until 11 A. M., May 26, 1905, and then opened. Information furnished on application. **H. M. Adams**, Lieut. Col. Engrs. May 18

U. S. Engineer Office, Buffalo, N. Y., April 22, 1905. Sealed proposals for extending south pier and placing concrete superstructure on north pier at Erie, Pa., will be received here until 11 A. M., May 22, 1905, and then opened. Information furnished on application. **H. M. Adams**, Lieut. Col. Engrs. May 18

U. S. Engineer Office, Buffalo, N. Y., April 15, 1905.—Sealed proposals for channel and basin excavation at Erie Harbor, Pa., will be received here until 11 A. M., May 15, 1905, and then opened. Information furnished on application.—**H. M. Adams**, Lieut. Col. Engrs. May 11

U. S. Engineer Office, Buffalo, N. Y., May 6, 1905. Sealed proposals for channel excavation at Ogdensburg Harbor, N. Y., will be received here until 11 A. M., June 6, 1905, and then opened. Information furnished on application. **H. M. Adams**, Lieut. Col. Engrs. June 1

U. S. Engineer Office, Duluth, Minn., April 13, 1905.—Sealed proposals for furnishing and placing about 53,000 tons of riprap at Ashland, Wis., will be received here until noon, May 13, 1905, and then publicly opened. Information on application. **Chas. L. Potter**, Major Engrs. May 11

**PROPOSALS.**

U. S. Engineer Office, Room 508 Federal Bldg., Chicago, Ill., April 15, 1905.—Sealed proposals for rock excavation in Calumet River, Ill., will be received here until noon May 15, 1905, and then publicly opened. Information on application. **Wm. H. Bixby**, Lieut. Col. Engrs. May 11

U. S. ENGINEER OFFICE.—Grand Rapids, Mich. May 3, 1905. Sealed proposals for excavating new channel from Kalamazoo River to Lake Michigan will be received here until 3 p. m., June 2, 1905, and then publicly opened. Information furnished on application. **M. B. ADAMS**, Col., Engrs. May 25

U. S. Engineer Office, Buffalo, N. Y., April 13, 1905.—Sealed proposals for concrete superstructure on south pier, Buffalo, N. Y., will be received here until 11 A. M., May 13, 1905, and then opened. Information furnished on application.—**H. M. Adams**, Lieut. Col. Engrs. May 11

U. S. ENGINEER OFFICE, Buffalo, N. Y., April 20, 1905.—Sealed proposals for breakwater extension at Cape Vincent, N. Y., will be received here until 11 A. M., May 20, 1905 and then opened. Information furnished on application. **H. M. Adams**, Lieut. Col. Engrs. May 18

U. S. Engineer Office, Galveston, Tex., May 1, 1905.—Sealed proposals, in triplicate, for suction dredge, will be received here until 12 m., May 31, 1905, and then publicly opened. Information furnished on application. **Edgar Jadwin**, Capt., Engrs. May 25

U. S. Engineer Office, Duluth, Minn., May 4, 1905. Sealed proposals for pier work at Port Wing, Wis., will be received here until noon, June 5, 1905, and then publicly opened. Information on application. **Chas. L. Potter**, Major, Engrs. June 1

**FOR SALE.****Patent on Valuable Nautical Invention.**

A device in the form of an air buoy for definitely locating sunken vessels. Should the vessel sink upon which this buoy is placed, the buoy floats, and a line, made fast in a separate compartment, unreels until the vessel strikes bottom, thereby locating the exact position of the sunken vessel. This buoy is also adapted for use as a mooring buoy for yachts of all sizes, and for all floating property. It can be manufactured and sold for much less than any other buoy in use. Will sell the patent for cash or exchange for vessel or other property. Address, **Capt. J. Fred Tribble**, 59 Broadway, Norwich, Conn. t.f.

**Tug Wm. Engel.**

A first class fishing rig for sale. Tug suitable for fishing or towing. For further information write to **Thomas Mader**, 81 Middle St., Kenosha, Wis. t.f.

**Dredging Outfits for Sale.**

Two dipper dredges one partly burned; two combination dipper and clam shell dredges; four tugs; dump scows; flat scows; dredging appliances. Complete business to be closed out. For particulars address **Carkin, Stickney & Cram**, Detroit. May 25

**Lake Tug for Sale.**

Tug **Kate Williams**—rebuilt 1901, rates 1½. Moored Manitowoc, Wis., where she may be inspected. For prices and terms address **Lake Shore Stone Co.**, Milwaukee, Wis. May 25

**FOR SALE.****For Sale.**

Ten shares of stock of Manitowoc Dry Dock Company, Manitowoc, Wis. Address Box 80, Marine Review. t.f.

**The Steamer Gordon Campbell.**

Burned on spar-deck—easy to cut down to lumber barge, to carry million feet. Machinery and boilers untouched. Hull untouched and in good condition. Boat in dry dock and thoroughly overhauled last summer. Can be seen in Chicago. Want best offer. **Simon Kruse**, Attorney, Ashland Block, Chicago. t.f.

**Tug Jim Pullar and Scow.**

Tug—built in 1894; 61 ft. long; 15 ft. beam. Water tube boiler. Compound condensing engine. Strong and seaworthy.

Scow—five years old. Excellent construction; 132 ft. long; 29½ ft. wide at center, 26 ft. wide at ends. Platform style, with stake pockets.

Tug and Scow recently overhauled and are in good condition. May be seen at Washburn, Wis., dock.

Address, **Fowler-Jacobs Co.**, Fisher Building, Chicago. t.f.

**Lighter for Sale.**

Lighter **Ann Walker**. Hull 93 x 20 x 9. House 79 x 18 x 8. Reason for selling, owner has no further use for her. Address **Mutual Transit Co.**, Buffalo, N.Y. May 18

**For Sale.**

FOR SALE.—Electric dynamos, direct connected to engines, also search-lights for marine work; good condition; cheap. **JORDAN BROS.**, 74 Beekman St., New York. April 27

**WANTED.****Men Wanted.**

WANTED.—Two pile driver crews to work at Waukegan, Ill. Apply Great Lakes Dredge & Dock Co., 1317-23 Chamber of Commerce, Chicago, Ill.

**Wanted.**

Second hand head light (electric), suitable for a boat 24 ft. beam, 100 ft. long; three decks. **F. Heywood**, 420 Third street W., Minneapolis, Minn.

**Tug Wanted.**

Wanted, a good second-hand tug boat, 35 to 50 ft. in length, not over 13 ft. beam amidships, about 5 ft. draft. Hull particularly to be in first class condition. Address the **Wolverine Portland Cement Co.**, Coldwater, Mich. May 11.

**Salesmen Wanted.**

Wanted.—Salesmen or agents to sell a patented specialty of great merit for boilers, which is already being used by the largest concerns. Address **Power Specialty Co.**, 513 Washington Arcade, Detroit, Mich. t.f.

## 'Buyers' Directory of the Marine Trade.—Continued.

**ENGINE BUILDERS, MARINE.**

American Ship Building Co.....Cleveland.  
 Atlantic Works.....East Boston, Mass.  
 Bertram Engine Works Co., Ltd.....  
 .....Toronto, Can.  
 Chicago Ship Building Co.....Chicago.  
 Chase Machine Co.....Cleveland.  
 Cramp, Wm. & Sons.....Philadelphia.  
 Craig Ship Building Co.....Toledo, O.  
 Dake Engine Co.....Grand Haven, Mich.  
 Detroit Ship Building Co.....Detroit.  
 Fletcher, W. & A. Co.....Hoboken, N. J.  
 Fore River Shipbuilding Co.....Quincy, Mass.  
 Great Lakes Engineering Works.....Detroit, Mich.  
 Hall Bros.....Philadelphia.  
 Lockwood Mfg. Co.....East Boston, Mass.  
 Marine Iron Works.....Chicago.  
 Maryland Steel Co.....Sparrows Point, Md.  
 Mietz, Aug.....New York.  
 Milwaukee Dry Dock Co.....Milwaukee.  
 Mosher, Chas. D.....New York.  
 Moulton Steering Engine Co.....New York.  
 Newport News Ship Building Co.....  
 .....Newport News, Va.  
 New York Shipbuilding Co.....Camden, N. J.  
 Northwestern Steam Boiler & Mfg. Co.....  
 .....Duluth, Mich.  
 Roach's Ship Yard.....Chester, Pa.  
 Sheriffs Mfg. Co.....Milwaukee.  
 Superior Ship Building Co.....Superior, Wis.  
 Thropp, J. E. & Sons Co.....Trenton, N. J.  
 Trout, H. G.....Buffalo.  
 Willard, Chas. P. & Co.....Winthrop Harbor, Ill.

**ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.**

Cory, Chas. & Son.....New York.  
 Marine Mfg. Supply Co.....New York.

**ENGINE TESTING.**

Kreer & Parsons.....Chicago.

**ENGINEERING SPECIALTIES AND SUPPLIES.**

Crane Co.....Chicago.  
 Kieley & Mueller.....New York.  
 Lunkenheimer Co.....Cincinnati.  
 New York Belting & Packing Co.....New York.  
 Northwestern Steam Boiler & Mfg. Co.....  
 .....Duluth, Minn.

**ENGINEERS, MARINE, MECHANICAL, CONSULTING.**

Hynd, Alexander.....Cleveland.  
 Hunt, Robt. W. & Co.....Chicago.  
 Kidd, Joseph.....Duluth, Minn.  
 Kreer & Parsons.....Chicago.  
 Lovejoy, H. O.....Buffalo.  
 Mosher, Chas. D.....New York.  
 Nacey, James.....Cleveland.  
 Rice, Henry.....Buffalo.  
 Roelker, H. B.....New York.  
 Wood, W. J.....Chicago.

**FANS FOR VENTILATION, EXHAUST, ETC.**

Sturtevant, B. F. Co.....Hyde Park, Mass.

**FEED WATER PURIFIERS AND HEATERS.**

Greacen-Derby Engineering Co.....  
 .....Perth Amboy, N. J.  
 Ross Valve Co.....Troy, N. Y.

**FIXTURES FOR LAMPS, OIL OR ELECTRIC.**

General Electric Co.....Schenectady, N. Y.

**FORGES.**

Sturtevant, B. F. Co.....Boston.

**FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.**

Cleveland City Forge & Iron Co.....Cleveland.  
 Fore River Shipbuilding Co.....Quincy, Mass.  
 Macbeth Iron Co.....Cleveland.

**FLUE WELDING.**

Fix's, S. Sons.....Cleveland.

**FUEL ECONOMIZERS.**

Sturtevant Co., B. F.....Hyde Park, Mass.

**FUELING COMPANIES AND COAL DEALERS.**

Hanna, M. A. & Co.....Cleveland.  
 Ironville Dock & Coal Co.....Toledo, O.  
 Parker Bros. Co., Ltd.....Detroit.  
 Pickands, Mather & Co.....Cleveland.  
 Pittsburgh Coal Co.....Cleveland.  
 Smith, Stanley B., & Co.....Detroit.  
 Smith Coal & Dock Co., Stanley B. Toledo, O.

**FUELING PLANTS, BUILDERS OF**

Link Belt Machinery Co.....Chicago.

**FURNACES FOR BOILERS.**

Continental Iron Works.....New York.

**GAS BUOYS.**

Safety Car Heating & Lighting Co.....New York.

**GAS AND GASOLINE ENGINES.**

Chase Machine Co.....Cleveland.  
 Georgian Bay Engineering Works.....  
 .....Midland, Ont.

**GAUGES, STEAM AND VACUUM.**

Ashton Valve Co.....Boston.  
 Lunkenheimer Co.....Cincinnati.

**GAUGES, WATER.**

Bonner & Co., Wm. T.....Boston.  
 Lunkenheimer Co.....Cincinnati, O.

**GRAPHITE.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.

**GREASE EXTRACTORS.**

Greacen-Derby Engineering Co.....  
 .....Perth Amboy, N. J.

**HAMMERS, STEAM.**

Chase Machine Co.....Cleveland.

**HEATING APPARATUS.**

Sturtevant, B. F. Co.....Hyde Park, Mass.

**HOISTS FOR CARGO, ETC.**

American Ship Building Co.....Cleveland.  
 Brown Hoisting Machinery Co. (Inc.).....  
 .....Cleveland.  
 Chase Machine Co.....Cleveland.  
 General Electric Co.....New York.  
 Georgian Bay Engineering Works.....  
 .....Midland, Ont.  
 Hyde Windlass Co.....Bath, Me.  
 McMyler Mfg. Co.....Cleveland.  
 Marine Iron Co.....Bay City.  
 Mietz, Aug.....New York.

**HOLLOW STAYBOLT IRON.**

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

**HOSE, RUBBER.**

New York Belting & Packing Co.....New York.

**HYDRAULIC DREDGES.**

Great Lakes Engineering Works.....Detroit.

**HYDRAULIC TOOLS.**

Watson-Stillman Co., The.....New York.

**ICE MACHINERY.**

Great Lakes Engineering Works.....Detroit.  
 Roelker, H. B.....New York.

**INDICATORS FOR STEAM ENGINES.**

Ashton Valve Co.....Boston.

**INJECTORS.**

American Injector Co.....Detroit.  
 Crane Co.....Chicago.  
 Jenkins Bros.....New York.  
 Lunkenheimer Co.....Cincinnati.  
 Penberthy Injector Co.....Detroit, Mich.

**INSURANCE, MARINE.**

Elphicke, C. W. & Co.....Chicago.  
 Fleming & Co., E. J.....Chicago.  
 Gilchrist & Co., C. P.....Cleveland.  
 Hawgood & Co., W. A.....Cleveland.  
 Helm & Co., D. T.....Duluth.  
 Hutchinson & Co.....Cleveland.  
 McCarthy, T. R.....Montreal.  
 McCurdy, Geo. L.....Chicago.  
 Mitchell & Co.....Cleveland.  
 Parker Bros. Co., Ltd.....Detroit.  
 Peck, Chas. E. & W. F.....New York & Chicago.  
 Prindiville & Co.....Chicago.  
 Richardson, W. C.....Cleveland.  
 Sullivan, D. & Co.....Chicago.

**IRON ORE AND PIG IRON.**

Bourne-Fuller Co.....Cleveland, O.  
 Hanna, M. A. & Co.....Cleveland.  
 Pickands, Mather & Co.....Cleveland.

**LAUNCHES—STEAM, NAPHTHA, ELECTRIC.**

Georgian Bay Engineering Works.....  
 .....Midland, Ont.  
 Marine Iron Works.....Chicago.  
 Truscott Boat Mfg. Co.....St. Joseph, Mich.  
 Willard, Chas. P.....Winthrop Harbor, Ill.

**LIFE PRESERVERS, LIFE BOATS, BUOYS.**

Armstrong, Cork Co.....Pittsburg.  
 Drein, Thos. & Son.....Wilmington, Del.  
 Gaynor, T. F.....New York.  
 Kahnweiler's Sons, D.....New York.  
 National Cork Co.....Brooklyn.

**LIGHTS, SIDE AND SIGNAL.**

Russell & Watson.....Buffalo.

**LOGS.**

Nicholson Ship Log Co.....Cleveland.  
 Walker & Sons, Thomas.....Birmingham, Eng.  
 Also Ship Chandlers.

**LUBRICATING GRAPHITE.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.

**LUBRICATORS.**

Crane Co.....Chicago.  
 Lunkenheimer Co.....Cincinnati.

**LUMBER.**

Martin-Barriss Co.....Cleveland.

**MACHINISTS.**

Chase Machine Co.....Cleveland.  
 Hickler Bros.....Sault Ste. Marie, Mich.  
 Lockwood Mfg. Co.....East Boston, Mass.

**MACHINE TOOLS (WOOD WORKING).**

Atlantic Works, Inc.....Philadelphia.

**MARINE RAILWAYS.**

Hickler Bros.....Sault Ste. Marie, Mich.

**MARINE RAILWAYS, BUILDERS OF.**

Crandall & Son, H. I.....East Boston, Mass.

**MATTRESSES, CUSHIONS, BEDDING.**

Fogg, M. W.....New York.

**MECHANICAL DRAFT FOR BOILERS.**

American Ship Building Co.....Cleveland.  
 Detroit Ship Building Co.....Detroit.  
 Great Lakes Engineering Works.....Detroit.  
 Sturtevant, B. F. Co.....Hyde Park, Mass.

**METALLIC PACKING.**

Katzenstein, L. & Co.....New York.

**METAL POLISH.**

Bertram's Oil Polish Co.....Boston.

**MOTORS, GENERATORS—ELECTRIC.**

Fisher Electrical Works.....Detroit.  
 General Electric Co.....Schenectady, N. Y.  
 Sturtevant, B. F. Co.....Hyde Park, Mass.

**NAUTICAL INSTRUMENTS.**

Ritchie, E. S., & Sons.....Brookline, Mass.

**NAVAL ARCHITECTS.**

Hynd, Alexander.....Cleveland.  
 Kidd, Joseph.....Duluth, Minn.  
 Kreer & Parsons.....Chicago.  
 Lovejoy, H. O.....Buffalo.  
 Matteson & Drake.....Philadelphia.  
 Mosher, Chas. D.....New York.  
 Nacey, James.....Cleveland.  
 Rice, Henry.....Buffalo.  
 Wood, W. J.....Chicago.

**OAKUM.**

Stratford, Oakum Co.....Jersey City, N. J.

**OIL ENGINES.**

Mietz, Aug.....New York.

**OILS AND LUBRICANTS.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.  
 Standard Oil Co.....Cleveland.

**PACKING.**

Crane Co.....Chicago.  
 Jenkins Bros.....New York.  
 Katzenstein, L. & Co.....New York.  
 New York Belting & Packing Co.....New York.

**PAINTS.**

Baker, Howard H. & Co.....Buffalo.  
 Upson-Walton Co.....Cleveland.

**PATTERN SHOP MACHINERY.**

Atlantic Works, Inc.....Philadelphia.



**WANTED and FOR SALE Department Continued.****Steam Yacht Catherine.**

FOR SALE—Length 78 ft., beam 18 ft., triple expansion engines, water-tube boiler, allowed 200 lbs.; electric light, search light, mahogany deck-house 9 x 16, power launch, complete outfit, all in first-class condition. One of the best family cruising yachts on the Lakes. Inquire Wickes Bros., Saginaw, Mich. tf

**For Sale.**

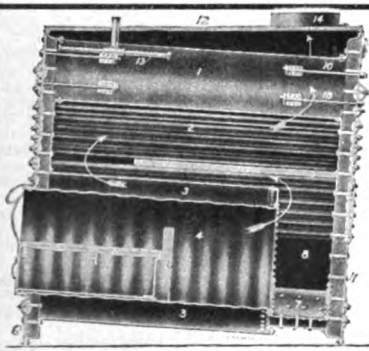
This up-to-date Gasoline Yacht 65x9½, mahogany finished throughout; large cabin, plate glass windows, mahogany blinds; fine carpets and upholstery; excellent electric light plant—dynamo, storage batteries and search light. Entire boat can be easily converted into cabin if desired.

Rapid fire yacht cannon; anchor, life preservers, flags, etc., complete. Very fast 4 cylinder, 4 cycle King engine of 50 h. p. Cost nearly \$8,000, will sell at great bargain.

O. J. MULFORD, Stevens Bldg., Detroit.

**Marine Boiler.**

For Sale.—One 50 H. P. Scotch Marine Boiler, 10 ft. long, 78 in. diameter, 160 lbs. steam pressure. Manufactured by Ritter & Co., Buffalo, N. Y. In first class shape. For particulars, write The Detroit Stove Works, Detroit, Mich. t. f.

**Detroit Scotch Water Tube Boiler**

Internally Fired.

Scotch and Water Tube types combined, eliminating all objections.

Half the weight of ordinary Scotch boilers.

Standard corrugated furnaces.

Patent applied for.

Investigate before buying any other.

**EAST END BOILER WORKS**  
Detroit, Mich.

**ROACH'S SHIP YARD.**

Ship  
Building  
in all its  
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Hickler Bros. .... Sault Ste. Marie, Mich.  
Lake Superior Contracting & Dredging Co. .... Duluth, Minn.  
Parker Bros. Co., Ltd. .... Detroit.  
Smith Co., J. P. & J. A. .... Cleveland.  
Starke Dredge & Dock Co., C. H. .... Milwaukee.  
Sullivan, M. .... Detroit

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Bourne-Fuller Co. .... Cleveland, O.  
Crane Co. .... Chicago.  
Macbeth Iron Co. .... Cleveland.  
Reading Iron Co. .... Reading, Pa.

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Reading Iron Co. .... Reading, Pa.

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Ross Valve Co. .... Troy, N. Y.

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Fore River Shipbuilding Co. .... Quincy, Mass.  
Great Lakes Engineering Works. .... Detroit.  
Hyde Windlass Co. .... Bath, Me.  
Lockwood Mfg. Co. .... East Boston, Mass.  
Marine Iron Works. .... Chicago.  
Milwaukee Dry Dock Co. .... Milwaukee.  
Newport News Ship Building Co. .... Newport News, Va.  
Roelker, H. B. .... New York.  
Sheriffs Mfg. Co. .... Milwaukee.  
Superior Ship Building Co. .... Superior, Wis.  
Thropp & Sons Co., J. E. .... Trenton, N. J.  
Trout, H. G. .... Buffalo.

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General Electric Co. .... Schenectady, N. Y.

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Marine Iron Works. .... Chicago.  
Kingsford Foundry & Machine Works. .... Oswego, N. Y.

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Roelker, H. B. .... New York.

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Great Lakes Register. .... Cleveland.

**REPAIRS—ENGINE AND BOILER.**

(See also Boiler Manufacturers and Engine Builders.)  
Georgian Bay Engineering Works. .... Midland, Ont.

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Bourne-Fuller Co. .... Cleveland, O.

**SAFETY VALVES.**

Ashton Valve Co. .... Boston.  
Crane Co. .... Chicago.  
Lunkenheimer Co. .... Cincinnati.

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Upson-Walton Co. .... Cleveland.

**SALVAGE COMPANIES.**

See Wrecking Companies.

**SEARCH LIGHTS.**

General Electric Co. .... Schenectady, N. Y.

**SHEARS.**

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Otis Steel Co. .... Cleveland.

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Willard, Chas. P. & Co. .... Winthrop Harbor, Ill.

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Rice & Lovejoy. .... Buffalo.  
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Boston Steamship Co. .... Boston.  
International Mercantile Marine Co. .... Philadelphia.  
New York & Cuba Mail S. S. Co. .... New York.  
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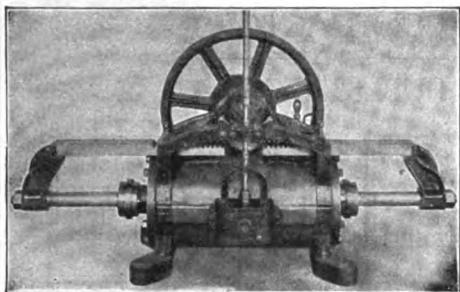
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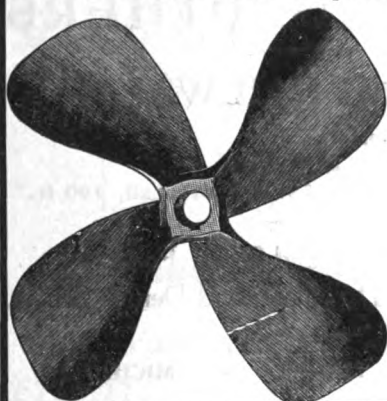
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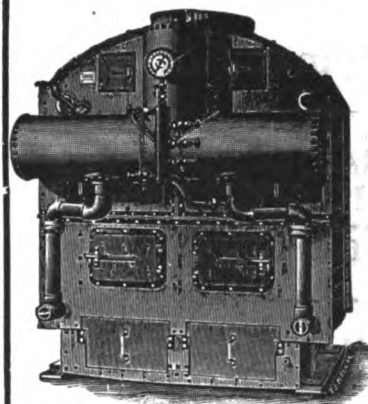
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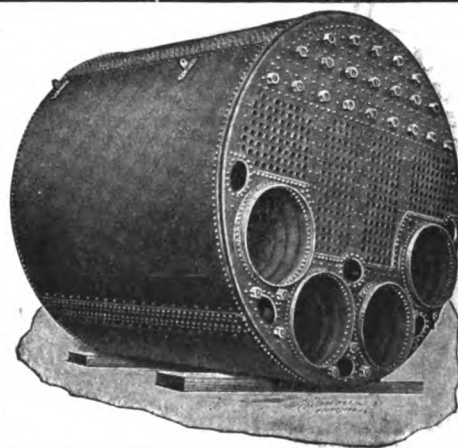
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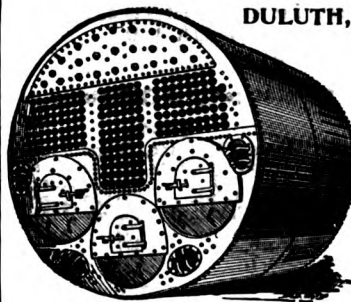
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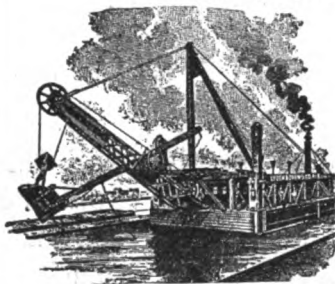
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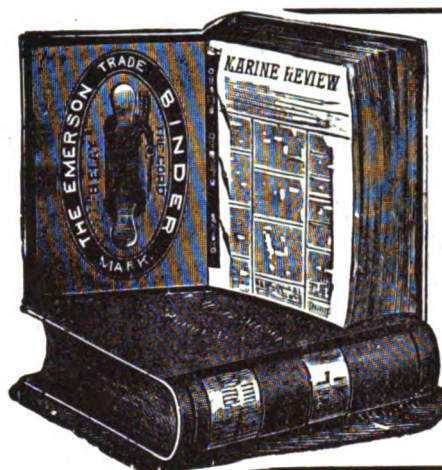
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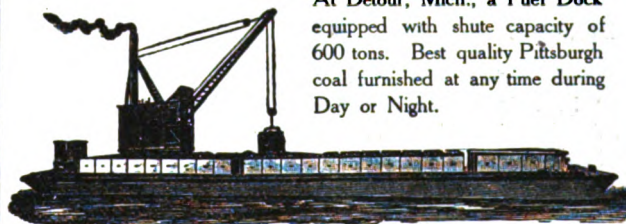


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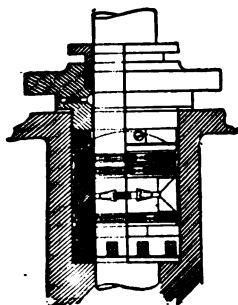
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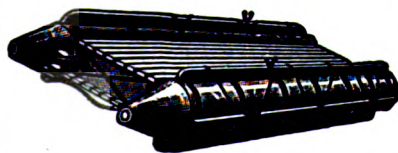
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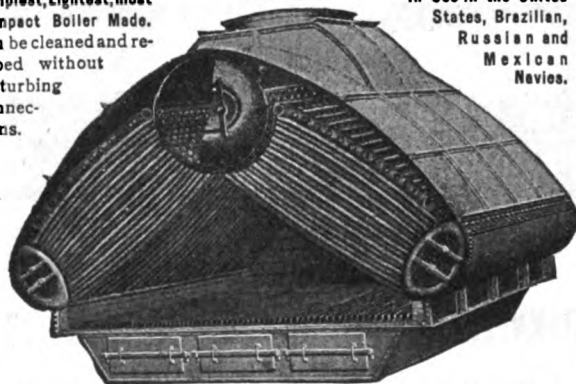
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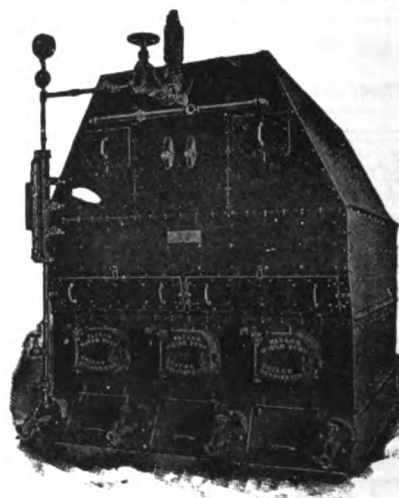
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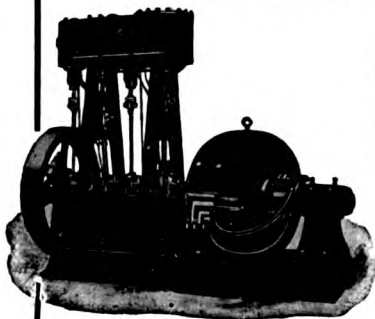
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Eastward	Arrive from West	Depart East
No. 18, Southwestern Limited .....	.....	*1:50 a.m.
No. 22, Lake Shore Limited .....	*2:12 a.m.	*2:20 a.m.
No. 20, Chicago and Cleveland Exp. ....	*7:20 a.m.	.....
No. 28, New York and Boston Exp. ....	*7:40 a.m.	*8:00 a.m.
No. 40, Toledo and Buffalo Accom. ....	†10:00 a.m.	†10:30 a.m.
No. 32, Fast Mail .....	*11:25 a.m.	*11:30 a.m.
No. 48, Accommodation via Sandusky .....	†1:40 p.m.	.....
No. 42, Boston-New York Express .....	.....	*11:45 a.m.
No. 44, Cleveland and New York Spl. ....	.....	*3:00 p.m.
No. 46, Southwestern Express .....	.....	*3:10 p.m.
No. 116, Ashtabula Accommodation .....	.....	†4:30 p.m.
No. 6, Limited Fast Mail .....	*5:40 p.m.	*5:45 p.m.
No. 26, 20th Century Limited .....	*7:40 p.m.	*7:43 p.m.
No. 10, Chicago, N.Y. & Boston Spl. ....	*7:30 p.m.	*7:50 p.m.
No. 16, New England Express .....	*10:30 p.m.	*10:35 p.m.
No. 2, Day Express .....	†9:10 p.m.	†9:25 p.m.
No. 126, Norwalk Accommodation .....	†7:55 a.m.	.....
Westward	Arrive from East	Depart West
No. 7, Exposition Limited .....	*12:50 a.m.	.....
No. 11, Southwestern Limited .....	*2:55 a.m.	.....
No. 9, Day Express .....	.....	†6:00 a.m.
No. 15, Boston and Chicago Special .....	*3:10 a.m.	*3:15 a.m.
No. 19, Lake Shore Limited .....	*7:15 a.m.	*7:25 a.m.
No. 23, Western Express .....	*10:30 a.m.	*10:35 a.m.
No. 29, Southwestern Special .....	†11:10 a.m.	.....
No. 33, Southwestern Express .....	*12:25 p.m.	.....
No. 133, Cleveland and Detroit Exp. ....	.....	*12:45 p.m.
No. 47, Accommodation .....	†11:00 a.m.	†3:00 p.m.
No. 141, Sandusky Accommodation .....	.....	†3:10 p.m.
No. 43, Fast Mail .....	*4:35 p.m.	*4:40 p.m.
No. 127, Norwalk Accommodation .....	.....	†5:10 p.m.
No. 37, Pacific Express .....	*6:50 p.m.	*7:20 p.m.
No. 3, Fast Mail Limited .....	*10:50 p.m.	*10:55 p.m.
No. 115, Ashtabula Accommodation .....	*8:30 a.m.	.....

\*Daily. †Ex. Sunday. ‡Ex. Monday. Nos. 23, 28 and 37 run via Erie Station. City Ticket Office, 237 Superior St.

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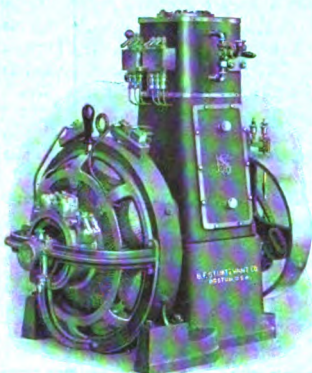
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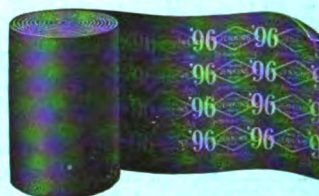
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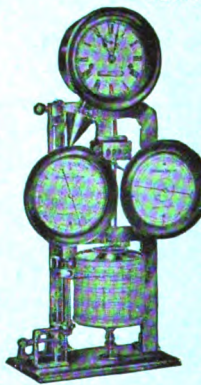
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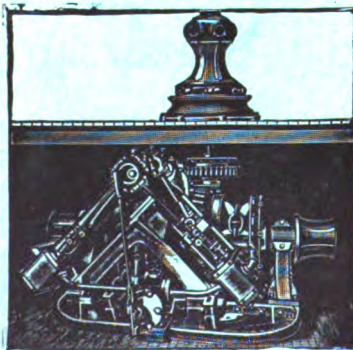
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